The Chemical Age

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A Stock-Taking of the Chemical Industry

THIS country may not have been the progenitor of chemical industry, but there can be no doubt that we led the world during that period which has become known as the Industrial Revolution. This great development was rendered possible by the possession of practically inexhaustible supplies of rock salt and limestone, together with ample supplies of coal of high quality worked by a vigorous coal-mining industry. We did not lose any of these natural advantages and we became possessed of many colonial sources of essential raw materials, but perhaps because of our immense success in the first half of the nineteenth century, we also became careless and allowed the initiative to pass into foreign hands. The war brought with it a rude awakening to the danger of the position; with the awakening came rejuvenescence, and a survey of the changes of the last quarter-century show clearly that it is not only the totalitarian countries that can with justice boast of virility.

It is well sometimes to survey what we have done and to take from the legitimate pride in our achievements encouragement for what remains to be done. Those engaged in the chemical plant industry, for example, know full well that though we are in the forefront of chemical manufacturers, we have not yet been able to persuade the foreign buyer of chemical plant that he should regard us as equal in every way to our competitors in certain other countries. That is a position which no doubt will in time be corrected, and in this publicity will certainly play a part, provided that it is backed up by suitable organisation for giving to the foreign buyer the same service that he gets from those who now have his favour. There may be salients in our line, but the achievements of British chemical industry as a whole are so striking that they serve as a clear indication of what can be done once we make up our minds to do it. It is admitted, of course, that we must face the handicap of not possessing plentiful supplies of cheap water-power; and we may not have in this country some of the raw materials possessed by others. In general, however, there are few branches of the chemical and chemical plant industry in which we are debarred by Nature from competing, and no branches in which our personal limitations need make us diffident. "We've got the men, we've got the works, we've got the money too!"

British chemical industry of to-day is vastly more efficient and self-contained than it was at the last period of emergency in 1914. *In the unfortunate event of any other similar crisis, British chemical industrialists are now in a much stronger position than heretofore to assist the Empire in the hour of need.*

—*Sir Gilbert T. Morgan.*

It was a happy thought on the part of the Royal Society of Arts to persuade Sir Gilbert Morgan to devote a series of Cantor Lectures to the subject of "Achievements of British chemical industry in the last twenty-five years." (The lectures have now been published in pamphlet form by the Royal Society of Arts.) It was certainly a remarkable accomplishment on the part of the lecturer to cover the whole British chemical industry in some 4 or 5 hours and to give such ample evidence of the revival that has come about. In 1915 the annual production of 20 per cent. oleum was 27,000 tons, but by 1918 it had become 450,000 tons. In 1914 we were dependent on the Stassfurt deposits for potash; in 1930 the Dead Sea venture was started and the preparation of chlorides, bromides and potash is a notable page in the post-war history of British chemical industry. Our achievements in vitamins enabled us to improve the food value of margarine immensely by the addition of vitamins A and D. The Billingham synthetic ammonia and synthetic petrol plants were quoted as evidence of new industries started since the war, together with the great electro-chemical industries of Scotland. The recent reorganisation of the coke oven industry deserves recognition. In 1913 we produced 4,069 tons of dyestuffs; in 1935, 27,332 tons, including some never before made in this country. The rise of the plastics and artificial silk industries have not found us lagging behind; in 1923 our output of phenol-formaldehyde resins was only 500 tons, but in 1936 it had risen to 15,000 tons. But the magnitude of the growth of the chemical industry is perhaps best shown by the statement that the A.B.C.M. when formed in 1916 had a membership of about 100 firms representing a capital of £39,000,000; to-day, while the membership has not greatly increased, the capital represented is over £200,000,000. It was shown that the total gross output of the chemical industry and allied trades in 1935 was over £411 million, of which about £22 million was exported, the remainder being used in this country. It is a wonderful achievement, and the lectures should be read in order to obtain a full picture of what has been done in the last quarter-century. Sir Gilbert is to be congratulated on putting it before us and allowing us for once to pat ourselves on the back.

NOTES AND COMMENTS

Advances in Chemotherapy

THE fact that most of the important discoveries in chemotherapy in the past have been made abroad is an old story. But its message has been fully appreciated and research in this field is now as fully advanced here as elsewhere. This state of affairs has been due not only to the individual efforts of British manufacturing chemists in seeking for new chemical substances of therapeutic value, but also to the development of research work in chemotherapy by the Medical Research Council through an annual Government grant specially provided for the purpose. The Council's annual report gives some indication of the valuable results which are being obtained and further progress in the application of sulphanilamide and allied derivatives has been recorded. The treatment of pneumonia by 2-sulphanilyl-aminopyridine has caused great interest and the report holds out the hope that if the claims of the powerful destructive action of this substance on the pneumococcus are substantiated then it should be possible to use it in cases of middle ear disease due to this organism. The importance of this is seen when it is realised that this disease is responsible for a large proportion of the 2½ million cases of deafness in this country.

Chemotherapeutic Possibilities of Undecamethylenediamidine

A BREAKAWAY from the usual type of anti-malarial compounds containing either a quinoline or an acridine nucleus is provided by undecamethylenediamidine. The report refers to effective tests which have been made with this new anti-malarial and points out that the margin between curative and toxic doses is narrow. As in the case of the sulphonamide derivatives in which large numbers have been prepared and tested in order to identify those of highest efficacy and lowest toxicity to the human, so in the same way the compounds related to undecamethylenediamidine afford a search of very wide scope. The report states that it has already been found that complex cyclic amidines, such as glyoxalines, can be used as terminal groups to produce trypanocidal compounds and that the long chain of methylenes uniting such groups can be replaced by ring-structures of comparable dimensions, such as naphthalene nuclei. The possible variations of the structure are enormous, but there are now known to be certain factors determining therapeutic activity which makes the search for the compounds of most practical value less of a hit or miss method. The factors mentioned in the report are the existence of a basic combining group in the molecule, and its strength, and the probable relationship existing between anti-malarial effectiveness and the inhibition of enzyme action.

Idle Plant

PLANT which is idle serves no immediate useful purpose about the works; that is a commonsense remark. Yet in the various chemical works throughout Great Britain there is an enormous amount of plant lying idle, merely due to lack of ideas rather than from any other real cause. At a large works there is always a job for someone to keep an eye upon idle plant, even if it is only the concern of maintenance staff or storekeeper. If not kept in condition the plant can never be ready to be put to good use when the opportunity occurs. Quite apart from this, an occasional survey of idle plant will often suggest new lines of manufacture or ways in which plant in use may be supplemented for conditions of better working. Sometimes the smooth course of a process can be greatly facilitated by the provision of an additional vessel, or a " bottle neck " in the flow of materials can be eliminated by installing an additional pump. Moreover, if a pump is kept in working order in such a capacity it will serve all the better when it becomes necessary to adopt it as a definite part of plant for a manufacturing process put into operation for the first time. Plant which is no longer required, or for which there is really no prospect of use in the future, can be regarded from the aspect of scrap—at its best possible market value. Scrap will sometimes prove very valuable, for example, where tin can be recovered from tin linings, and removed from the works will often give useful additional space.

Business at the B.I.F.

FROM all accounts the British Industries Fair which closed at the end of last week, was an outstanding success. In general, manufacturers appeared to be well satisfied with the business transacted, which in many sections of the Fair, showed a definite improvement on last year. In the chemical section, in which it was not expected that much business would be secured, it is reported that more genuine inquiries were received than in the 1938 Fair and a considerable increase was noted in the number of useful contacts that had been made. The total number of foreign and Empire buyers who visited the Fair reached a record figure, an increase of more than 700 over last year. One of the most satisfactory features in viewing the Fair in retrospect is the definite sign of the re-establishment of confidence in trading circles to which the amount of business done undoubtedly points. This is a happy augury for the future and, coupled with the fact that recent estimates show employment to be higher by 70,000 than a year ago, indicates that trade is on a steady up-grade.

Cornwall's Metal Resources

WE have always been dependent on overseas supplies of certain metals and ores and although it is known that there are deposits of some of the metals in this country, the full extent of our resources has not been estimated. It is announced that a comprehensive survey of the tin, copper, and lead resources of Cornwall is now being made; of these, generally speaking, the rich deposits near the surface only have been worked as the costs of deep mining have been prohibitive in view of the more cheaply worked deposits abroad. But it is obviously advantageous to know precisely our own reserves should it ever be necessary to fall back on them. The case of Cornish wolfram is particularly interesting. The President of the Cornish Institute of Mining Engineers states in a letter to *The Times* that, apart from the production of wolfram as a by-product at certain of the Cornish tin mines, at least one important property works solely for wolfram and that the output from Cornwall could be vastly increased if necessary. He points out that " this country prefers to import its supplies from the distant parts of the earth rather than to develop its still considerable native reserves of base metals with the resulting employment and enrichment of the home population." At present the bulk of the Cornish wolfram output is exported to Japan.

Age Resisters for Rubber

By
T. L. GARNER, M.Sc., F.I.R.I.

ORDINARY compounded and vulcanised rubber products have a limited life, depending upon the use to which they are put, because of the effects of heat, oxidation, and exposure to sunlight. While the action of light could be resisted in rubber surfaces which were not abraded by the use of wax which bloomed to the surface and formed a protective layer, the protection of the rubber from the effects of heat and oxygen did not become practically possible until about fifteen years ago. To-day the use of an antiageing material in rubber compounding is practised in most rubber mixings; possibly it might be said that unnecessary advantage is taken of the protective action of such chemicals, the latter being incorporated as a safeguard in cases where good compounding would render them unnecessary. Certainly before antioxidants were available the compounder had only his own skill to rely on for good ageing properties, and his ingredients to ensure correct vulcanisation needed careful adjustment. Now errors in compounding can to some extent be masked by the use of antiagers; this is a careless and expensive way in which to use them, and is not the function they are intended to satisfy. Even with careful compounding it was usual, however, to vulcanise to what is called a good "technical cure," a term which covered vulcanising to a point short of optimum physical properties. By so doing, the rubber product continued to improve in its physical condition for a period and thus offset the effects of ageing. Using antioxidants the maximum physical properties desired may be aimed at from the outset and a better product thus prepared which will nevertheless age better than the product not containing an antiager. It is the general practice to-day to vulcanise fully such important articles as tyres, for example, and to avoid any tendency to under-vulcanisation. The principle of under-curing somewhat is unsatisfactory in many cases and generally to-day articles are vulcanised to give the best possible properties for the purpose in mind immediately after cure, and to retain these properties by suitably compounding with antioxidants.

Handling Properties of Antioxidants

Early commercial antioxidants were aimed almost entirely at preventing oxidation, but to-day there are various types for different purposes, in particular those developed to prevent flex-cracking, especially in tyre treads, and in most factories having a varied output more than one type will be in use. In the opinion of the writer, a good antiager should also possess desirable handling properties; that is, it should be easy of incorporation and dispersion in the batch, and, of course, be non-toxic. Some liquid materials, while dispersing readily in the rubber are very sticky fluids, and are difficult to handle in the drug room; in addition there may be some waste because of this through drums, etc., not being properly cleaned out—an important point with material costing several shillings a pound. Preferably also an antiager should not affect the vulcanising properties of the mix in any way, so that it may be incorporated without the necessity of formulæ revision.

The question of the use of antioxidants in brightly coloured or white rubber mixes was for many years a difficult problem. In the case of all the early commercial antioxidants it was soon found that they gave to the rubber containing them a yellow or brown stain, and not only was this the case, but in contact with other materials, such as linoleum, the latter was also stained. For many years it was quite a valuable guide to the protection value of an antiager to expose a standard mix containing it to ultraviolet light and see how badly the rubber stained; the worse the stain the better the product. Research in recent years, however, has resulted in the production of a number of non-staining antioxidants with very satisfactory protective properties.

All antioxidants are expected, naturally, to have age-resisting properties, and the first tests to be carried out should be those on the value of the material in this connection. A suitable accelerated mix for this purpose is the following:—Raw rubber, 100; zinc oxide, 5; sulphur, 3½; diphenylguanidine, 1; antioxidant, 1.

Ageing Tests on Antioxidants

After standard vulcanisation of such a mix side by side with a blank not containing the antioxidant, comparative ageing tests must be carried out by one of the usual accelerated tests, such as the Geer oven or the oxygen bomb apparatus. Stress-strain figures before and after ageing will show the value of the particular antioxidant as regards heat, ageing resistance, and determine whether it appears worth while to proceed to other tests. Naturally, in determining the vulcanisation period of the test blocks, allowance must be made for any effect of the antioxidant on the curing rate, although it is better for such effect to be absent. Obviously, in testing an antioxidant for use in white rubber, the figures obtained in the above tests are only of value if the product is of the non-staining variety.

The actual prevention of normal ageing as judged by the lowering of tensile strength is not by any means the only factor in judging an antioxidant and, in fact, in many cases is not the chief factor. Resistance to flex cracking, particularly in the case of motor tyre treads, has become of the greatest importance and many types of antioxidant have special qualities in this direction. In testing to evaluate a product from this point of view a test machine is used which bends a suitable testpiece rapidly backwards and forwards in some way as, for example, in using a moulded testpiece with teeth, similar to a cog wheel with sharp-angled bases, using a belt made up by joining a number of these over pulleys so that the bases of the teeth are alternately stretched and released. In due course with such a test the rubber eventually shows cracks at the base of the teeth and a comparison with a known standard will show how the antioxidant under test compares. A few hours run will usually produce a sufficient depth of cracking for a reasonable comparison to be made.

In the early days of antioxidants many troubles were experienced due to the discoloration of rubber containing them or through the staining of articles coming into contact with such rubber. Composite articles of fabric and such rubber may develop characteristic staining of the fabric, while the antioxidant will also cause staining in adjacent rubber in composite products. A considerable amount of research has been carried out on non-staining antioxidants, and commercial products of this type are now available which compare favourably with the best of the staining varieties.

In testing for staining and discoloration, exposure of samples to ultraviolet light will rapidly show whether trouble may be expected from this cause, and in fact, until the development of the non-staining varieties of antioxidants, the extent of the rapidity of the discoloration on this test gave a very good indication of the quality of the material.

The Action of Copper

The presence of copper in rubber mixtures is well-known to be of the greatest detriment to good ageing properties. Examining a variety of stocks including those of high rubber content and those which are highly compounded, it has been found that deterioration accelerated by copper can be effectively retarded by the use of suitable antioxidants, secondary aromatic amines being much more effective than other

antioxidants in regard to tread stocks. A suggestion has also been made that in the evaluation of antioxidants, copper compounds should be added to the test mix since they accelerate oxidation, and in this way the beneficial effects of the antioxidant can be better determined.

Surface Application of Antioxidants

Generally, the incorporation of an antioxidant, when required, in the rubber mix is desirable. In this way protection is afforded throughout the mass of the rubber, and not just in the surface layers, a matter of importance particularly where internal heat may be developed in service. It is obvious also that more antioxidant can be incorporated by mixing, and in addition, in the case of surface application, slight surface abrasion will destroy the value of the treatment and render a second application (not always practicable) necessary. Further, incorporation in the rubber mix is a much simpler matter than treating articles subsequent to normal manufacture.

There are, however, occasions when the surface treatment of rubber by antioxidant solutions is of value, where, for example, an antioxidant has not been used and is later considered desirable, or even in the case of articles already in service. Materials can be used for surface application also which it is not desirable to incorporate into the mix, such as where the curing or processing might be affected. The surface treatment can only be regarded as a subsidiary process to meet unexpected conditions and in general mill incorporation which is the most practical and efficient method of introducing the antioxidant, is universally practiced.

Chemical Matters in Parliament

Fertilisers Act

IN the House of Commons on February 28, Mr. Westwood asked the Secretary of State for Scotland whether any conference had been held between the Department of Agriculture for Scotland and the Association of County Councils in Scotland, on the desirability of amendment of the Fertilisers and Feeding Stuffs Act, 1926; whether proposals had been considered for speedy amendment of the foregoing Act, with special reference to the supply of lime; whether he was aware that the County Councils Association were desirous of this; and what action did he propose to meet the desires of the Association.

The Secretary of State for Scotland (Mr. Colville) replied that a meeting had taken place between representatives of the Department of Agriculture for Scotland and the Association of County Councils in Scotland, and he was fully aware of the Association's proposals for amendment of the Fertilisers and Feeding Stuffs Act. He was at present in consultation with the Minister of Agriculture and Fisheries as to whether a committee should be set up to inquire into the whole matter.

In the House on the following day Mr. Westwood moved that "leave be given to bring in a Bill to amend the Fertilisers and Feeding Stuffs Act, 1926." He pointed out that the Bill was directed to safeguard a purchaser of lime from the dishonest manufacturer or seller. The question was agreed to and the Bill was ordered to be brought in.

Export of Sulphate of Ammonia

In the House of Commons on February 28, Mr. J. Morgan asked the President of the Board of Trade the quantity of sulphate of ammonia exported in a form suitable for use as an agricultural fertiliser during 1938 and at what average f.o.b. price.

In reply Mr. Stanley stated that during the year 1938 exports from the United Kingdom of sulphate of ammonia amounted to 313,000 tons, of an average declared value (f.o.b.) of £6 11s. 1d. per ton. He understood that all the sulphate of ammonia exported was in a state suitable for use as an agricultural fertiliser.

Oil Extraction Plant

On the same day Mr. A. Edwards asked the Secretary for Mines whether he had investigated the claims made for the oil-from-coal plant erected at Bedlay Colliery, Glenborg; and, if so, whether he could state the result of such investigation.

Captain Crookshank: The company owning this plant have kept my Department informed regarding the development of their process, but, as the plant has only recently been put into operation, it is, I fear, too early to make any definite statement about results.

In the House of Commons on March 2, Mr. Cape asked the Secretary for Mines whether any efforts had been made in Cumberland to erect plants for the extraction of oil from coal; and, if so, what progress, if any, had been made in the matter.

Captain Crookshank: From time to time efforts have been made to secure the installation of an oil from coal plant in Cumberland, but so far without success.

Mr. Lunn asked the Secretary for Mines whether he could state the number of people employed, directly and indirectly, in the production of oil from coal; and if they were on the increase.

Captain Crookshank replied that a large proportion of the oil produced from coal was a by-product obtained from the carbonisation of coal at numerous coke-oven plants and gas works. Particulars were not available which would enable the information asked for to be supplied. The production of motor spirit had been doubled in the last four years, but it was not possible to indicate the actual extent of the consequent increase in employment.

New Zealand Import of Paints

In the House of Commons on March 6, Sir D. Thomson asked the President of the Board of Trade whether his attention had been drawn to the reduction of between 50 per cent. and 75 per cent. in the quantity of paints which, under the new restrictions, it was now allowable to import into New Zealand from the United Kingdom; and whether our total exports to New Zealand would be diminished by any such figure.

Mr. Cross stated in reply that the answer to the first part of the question was in the negative. Such information as Sir D. Thomson had did not bear out the suggestion that imports into New Zealand of paints of United Kingdom origin were being reduced to the extent mentioned.

SOVIET CHEMICAL INDUSTRY UNDER THE THIRD FIVE-YEAR PLAN

The draft of the Soviet's third five-year plan lays down that the chemical industry must be transformed into one of the leading branches of Soviet industry. The rate of growth of the chemical industry will be considerably more accelerated than the growth of industry as a whole. Marked increases are indicated in the output of all products manufactured by the chemical industry. The output of fertilisers is to be doubled; the output of substances used for the extermination of agricultural pests will be increased 4-6 times. New branches of the chemical industry will be created for the manufacture of organic compounds, and new chemical works will be built for the manufacture of sulphuric acid, nitrogenous fertilisers, synthetic rubber, etc. The third five-year plan will considerably increase the base of raw materials for the chemical industry by utilising to the maximum the local source of supply. Thus, the output of the Khibinsk apatite mines will be increased from 1,157,000 tons in 1937 to 2,400,000 tons in 1942.

New Plant for Synthetic Nitrogen Products

Important Montecatini Development

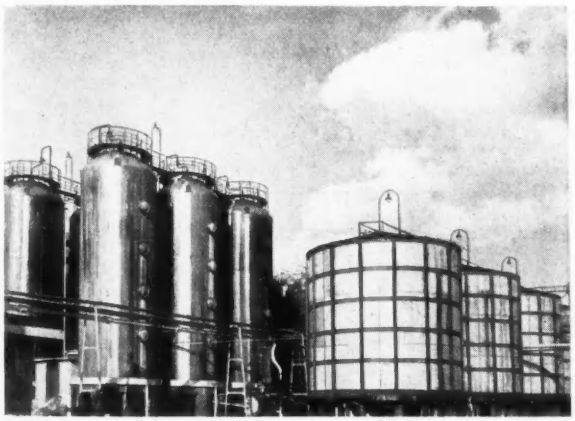
AN important plant for the synthetic production of nitrogen compounds has been opened by the Montecatini concern at San Giuseppe di Cairo, not far from Savona, Italy.

The principal raw material used is coal, which can be brought to the plant by rail or by water to Savona. In the latter case it is carried by an overhead cableway about 12 miles in length to the plant, where there is a large handling installation, capable of moving the 2,200 tons of coal used daily by the plant. The coal is distilled in three batteries of Otto type compound chambers, comprising 37 chambers per battery. Each of the chambers is 13.6 metres long, 4.19 high and 0.5 wide and has a capacity of 200 tons of coal per day. Heating is carried out partly with the gas produced and partly with producer gas made for the purpose. Usual apparatus for tar distillation, recovery of ammonium sulphate and removal of benzol and other by-products is installed.

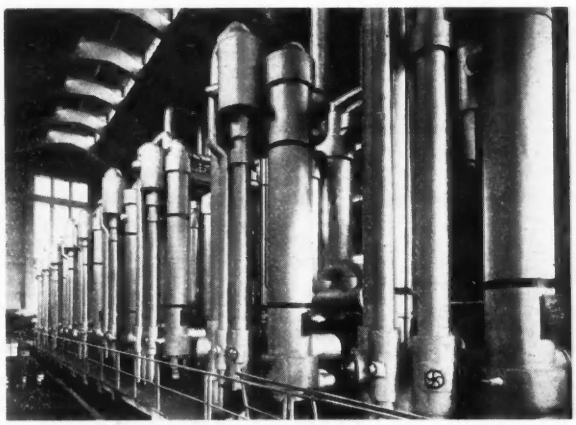
The gas obtained is first purified, compressed and then washed with water and soda to remove carbon dioxide. It is then further compressed and cooled down to −190° C. hydrogen removed and the liquid fractionated. The hydrogen is mixed with nitrogen for ammonia synthesis, the nitrogen required for this synthesis being obtained by compressing and cooling air in a similar manner to that used in removing hydrogen from the coal gas. The pure oxygen obtained during the process is stored up for future use in oxidising the ammonia.

Ammonia synthesis is carried out in Fauser type columns into which the mixture of hydrogen and nitrogen is introduced at a pressure of 300 atmospheres. The resultant product is partly in liquid and partly in gaseous form; the latter is stored at atmospheric pressure in large heat insulated containers. Production of ammonia amounts to about 70 tons per column per day. Nitric acid (136°Bé.) is obtained by pressure absorption of the nitrogen oxides obtained directly from oxygen and nitrogen in two plants operating on the Fauser system. Concentration of the acid is carried out by treatment with oleum. Oleum needed for this purpose is itself produced on the plant by the contact process, using pyrites as the source of sulphur and vanadium as catalyst.

Ammonium nitrate is produced by combination of ammonia, nitrogen and oxygen under pressure in Fauser chambers; this gives the solid salt directly as a precipitate without the need for concentrating it from a liquor. Calcium nitrate is produced by ordinary methods, and the other principal remaining product produced by the plant is ammonium sulphate, in the preparation of which the waste oleum from the nitric acid concentration is utilised.



Towers and tanks for the production and storage of nitric acid.



Part of the plant for extracting hydrogen from coal gas.

General view of the new Montecatini plant.

Chemicals Used in Leather

A Review of Materials Now Finding Application

SOME of the recent discoveries of new chemicals for use in the tannery are described by Smith (*Chem. Met. Eng.*, 1939, *46*, 72-3). Among the chemical cures for hide preservation receiving increased attention are the arsenic cures consisting of white arsenious oxides dissolved in soda solution, and the metallic naphthenates. The latter salts, particularly that of copper, are well worth consideration as they can be made into excellent emulsions and possess good fungicidal properties.

Sodium sulphide is now widely employed in place of realgar as a depilatory. Hydrosulphites, sulphoxylates, or their organic derivatives are recent additions to a straight depilatory made of lime or caustic alkali and B.P. 487,097 mentions their use in conjunction with both arsenic and sodium sulphides as well as proteolytic enzymes.

Pancreatic enzymes in the presence of ammonium salts or other suitable weak alkalies are now used almost exclusively for the bating of hides. However, good results can be obtained by the addition of alkali metal polyphosphates, pyrophosphate or metaphosphate to the bating enzyme, and the *p*H of the solution maintained at 7.4. Increased emphasis is being placed upon synthetic tanning materials. Generally these are sulphonic acid condensation products and they are widely used for the preparatory stages of tanning and also for bleaching leather. Other synthetics are being made by reacting chlorophenol with sulphonic acid and treating the product with formaldehyde. Sulphite cellulose waste liquors are also used as a source of cheap tanning materials after the calcium salts have been removed by treatment with lime and sodium carbonate, sodium carbonate alone, ammonia or ammonium salts. Polyphosphates, $Na_2P_3O_{10}$, $Na_3P_4O_{13}$, $Na_{12}P_{10}O_{31}$, are now being used for tanning, either alone or in combination with other tanning materials. Zirconium oxychloride also is being used as a pre-tannage.

Some progress has been made with iron tannages in Germany, where the use of high molecular weight compounds is favoured. Products such as hexaurea iron chloride are mentioned in current patents and they are used in conjunction with ordinary sulphonic acid condensation products. Experience and research have shown that the more complex the iron salt molecule the greater the resistance of the resultant leather to oxidation and decay. It should, however, be stressed that it is Germany's economic policy of self sufficiency that is encouraging manufacturers to turn to cheap iron salts as sources of tanning materials. In normal times these new substitutes for chromium salts and vegetable extracts would not be used.

A good deal of attention is now being given to the claims of ethyl and benzyl cellulose for the finishing of leather. Ethyl cellulose is being used not only as a foundation for straight lacquers, but also incorporated with natural and synthetic waxes in the manufacture of wax finishes and water-bound pigment dopes. Notable progress has been made with the softer acrylic ester polymers for the finishing of morocco and good grade fancy leathers and unholstery. Chlorinated rubber as a leather finish is receiving serious consideration; however, several difficulties have yet to be overcome before it can be used on a commercial scale. Further developments will most likely lie in the direction of compounding chlorinated rubber with chlorinated naphthalene and other synthetic and natural waxes.

Complex organic compounds, such as amides of amino-carboxylic acid, are being used for mothproofing. A material obtained by reacting monomeric propylethyleneimine with epichlorhydrin has been patented by I. G. Farbenindustrie. The demand for fire-resistant leathers is not very great. It is difficult to achieve permanent and reliable results. The best products are likely to be obtained by forming insoluble aluminium compounds in the actual pores of the tanned leather.

Gum Rosin

Factors Accelerating its Troublesome Crystallisation from Solution

MR. W. GARVIE, of Newport Industries Inc. delivered an address to the Borough Oil and Colour Students Association on February 16 on "Naval Stores Products—Old and New." The author covered much the same ground as that of his previous address in November to the Birmingham Paint, Varnish and Lacquer Club (this journal 1938, *39*, 387-389) but included *inter alia*, some interesting remarks on gum rosin, from which the following is extracted.

Gum rosin or colophony is abietic acid in a fair state of purity; a good grade may contain up to 95 per cent. The impurities (called "nigre") have an influence on its properties but the properties of rosins derived from different pine species and countries are remarkably alike. The physical constants vary within quite close limits. Gum rosins from different localities do vary in some degree in their proneness to crystallise; Portuguese is perhaps the worst offender, with American gum at the other end of the scale. The paler the rosin the more crystalline—in other words, the presence of dark oxidised and colour bodies tends to inhibit the return of abietic acid to its stable condition. The crystallisation of rosin from solution can be very troublesome to the varnish and printing ink maker.

Rosin sometimes reaches the consumer in an opaque condition, this is due to one or other of two causes: (1) the presence of a small percentage of water which is referred to as "water opaque," and (2) the separation of abietic acid crystals—"crystal opaque." Water opaque rosin has a glassy fracture, while crystal opaque has a dull sugary fracture. Water opaque rosin is perfectly innocuous; crystal opaque rosin is undesirable for two reasons: (a) the melting point is raised to somewhere between 110° to 135° C, the latter figure being the melting point of pure abietic acid; rosin in this condition is unsuitable for the manufacture of alkali resinates or any type of reaction necessitating a temperature below 110° C.; and (b) crystalline rosin will readily re-crystallise from solutions in ordinary solvents, even if the solution has been heated to 150° C.

The crystallisation of rosin from solution is accelerated by the following factors:—

(1) Use of unsuitable solvents and unsuitable concentrations in normal solvents.
(2) Alternate heating and chilling.
(3) Presence of certain mineral and organic acids.
(4) Presence of water.
(5) Addition of highly crystalline organic substances.
(6) Mechanical work or vibration.

The latter point should be kept well in mind, high concentrations of rosin in mineral oil may stand up well in the laboratory but bulk deliveries crystallise in transit due to vibration.

In examining a solid rosin for proneness to crystallise, heat say 10 grams in a flat-bottomed uncovered basin at 110° C.; a satisfactory rosin should not form any crystals in less than 24 hours. In the case of solutions, arrange for sharp changes of temperature and shake occasionally—better still, periodically stir vigorously with an iron rod.

Lime hardening will confer virtual immunity as will preheating the rosin to 300° C. for sustained periods. Crystal opaque rosin is quite suitable, the temperature employed in the liming operation being above the critical point.

Special high solubility rosins are available to-day; there is, therefore, no need for the printing ink maker to put up with crystallisation troubles.

EXTENSIVE shale oil deposits in Wurttemberg are now to be exploited for the production of shale oil coke. With limestone the latter yields a cement of high bending and compression strength. In conjunction with this new phase in the utilisation of oil shale, a cement factory is to be erected.

Society of Public Analysts and Other Analytical Chemists

Annual General Meeting and Election of Officers

THE annual general meeting of the Society of Public Analysts and Other Analytical Chemists was held at the Institute of Chemistry, Russell Square, W.C.1, on March 3, the President, Professor W. H. Roberts, in the chair. The honorary treasurer, Dr. E. B. Hughes, presented the accounts for the year, which showed continued progress and a sound financial position of the Society itself and its journal the *Analyst*. The honorary secretary, Mr. L. Eynon, presented the report of the Council, which showed a membership of 857, an increase of 26 over the membership of the previous year. The Society has to record with deep regret the loss of some of its most valued members in the course of the past year, including two Past Presidents, Mr. E. R. Bolton and Dr. J. T. Dunn. The meetings of the Society have maintained their interest and attendance, and the Society's journal, the *Analyst*, under the editorship of Dr. C. Ainsworth Mitchell, has continued to grow in size and circulation. The two local branches of the Society, the North of England Section, under the chairmanship of Professor T. P. Hilditch, and the Scottish Section,

Professor W. H. Roberts, elected President of the Society of Public Analysts and Other Analytical Chemists for the year, 1939-1940.

under the chairmanship of Mr. E. Cockburn, have held a number of very successful meetings at various places in their areas.

The following were elected as Officers and Council for the year 1939/40: *President*: Professor W. H. Roberts, M.Sc., F.I.C. *Past Presidents serving on the Council*: F. W. F. Arnaud, Bernard Dyer, John Evans, Edward Hinks, G. Roche Lynch, G. Rudd Thompson. *Vice-Presidents*: E. B. Anderson, J. R. Nicholls, W. H. Simmons, T. P. Hilditch, T. Cockburn. *Hon. Treasurer*: E. B. Hughes. *Hon. Secretary*: Lewis Eynon. *Other Members of Council*: E. A. M. Bradford, R. C. Chirnside, D. C. Garratt, G. Van B. Gilmour, L. H. Lampitt, G. W. Monier-Williams, H. E. Monk, A. Scholes, W. M. Seaber, F. G. H. Tate, G. Taylor, E. Voelcker, J. B. McKean (Hon. Secretary, Scottish Section), J. R. Stubbs (Hon. Secretary, North of England Section).

At an ordinary meeting of the Society held before the annual general meeting, the following were elected members: F. C. Collins, R. Crosbie-Oates, B.Sc., F.I.C., Professor H. E. Fierz-David, J. G. Fife, M.Sc., F.I.C., W. C.

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The Handling of Tar

Cancer Risk Emphasised by New Determination of Benzpyrene Content of a Coal-Tar Pitch

THE substance responsible in the main for the relatively high incidence of cancer among tar workers was identified as 3,4-benzpyrene by Professor J. W. Cook in 1933. In this brilliant piece of classic research work Cook succeeded in extracting 2 grams of benzpyrene from 2 tons of British coal tar pitch. The proportion of carcinogenic compounds in tar will naturally vary from one type of coal to another and according to the method of processing. Nor is it certain, of course, that the whole of these substances is isolated in experimental work on tar. Thus it is asserted by A. Winterstein (*Chimie et Industrie*, Jan., 1939) that chromatographic analysis of coal tar pitch (origin not specified) revealed the presence of as much as 5 grams benzpyrene per ton or 5 times the quantity isolated by Cook. If Winterstein's figure is taken as typical, it can be calculated that a worker regularly employed in handling coal tar is liable to develop cancer after 15 years if he (or his clothing) comes into contact each day with 500 milligrams of tar. On this basis of calculation, it is estimated that the worker would absorb 100 milligrams of benzpyrene in the course of the 15 years. The example given by Winterstein is, of course, hypothetical but effectively drives home the need for extreme care in handling tar. This has long been realised in this country and the Manchester Committee on Cancer took the lead some years ago in developing a special protective skin dressing for use by workers in tar factories.

Many scientists are now studying experimental cancerisation in animals by applying regular small doses of a carcinogenic compound for a period of weeks until a tumour is formed. The chemicals chiefly used, in addition to 3,4-benzpyrene, are methyl cholanthrene and 1:2:5:6-dibenzanthracene, all of which are capable of producing cancer in rats in a matter of weeks. The risk of tar cancer in the experimentor himself would thus be a serious matter unless extreme care were taken. Fortunately, the slightest trace of carcinogenic compound upon the skin can be detected by the intense fluorescence when examined by the ultraviolet lamp, the limit of sensitivity in this case being less than one-hundred millionth of a gram.

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Hughes, N. E. G. N. Iyengar, W. E. Kemp, H. C. Lockwood, B.Sc., F.I.C., W. Marsden, F. Michel, A. H. Rheinlander, M.Sc., F.I.C., L. W. Ruddle, J. Straub, R. G. Thin, B.Sc., F.I.C., H. Wilkinson, B.Sc., Ph.D., E. G. Williams, M.A., A.I.C., F. R. Williams, Ph.D., B.Sc., A.I.C.

Following the annual general meeting a lecture was delivered by Sir Henry Dale, C.B.E., M.D., F.R.S., on "Biological Standardisation." The lecturer outlined the history of the establishment of standards for the biological assay of preparations of physiologically active products such as antitoxins, hormones, vitamins, etc. Attempts to set up units in terms of physiological effects under particular experimental conditions ("rat units," "mouse units," etc.) had led to wide discrepancies and great confusion, owing largely to the difficulty of reproducing the conditions under which the proposed units were first determined. Following the pioneer work of Paul Ehrlich the systematic establishment of International "units of activity" based on stable standard preparations of the active substances was begun under the auspices of the health organisation of the League of Nations in 1921, and a number of these standards have been prepared at the State Serum Institute, Copenhagen. Standards for a still larger number of products have more recently been prepared in this country at the National Institute for Medical Research, Hampstead, with which the lecturer is particularly associated. A general account was given on these developments and some particulars of the standard preparations now available.

Chemotherapeutic Substances and Vitamins

Investigations Recorded in the Report of the Medical Research Council

IN the description of the work of the National Institute for Medical Research on chemotherapy, given in the report of the Medical Research Council for the year 1937-1938, just published by the Stationery Office, it is stated that mention was made last year of a new starting-point for the synthesis of compounds with a curative action on experimental trypanosomiasis, originating in the discovery by Professor Warrington Yorke and Dr. E. M. Lourie of a direct trypanocidal action in the synthetic substance introduced some years earlier by German investigators as a substitute for insulin, under the name "synthalin." It had been found, in joint work by Dr. H. King, Professor Yorke and Dr. Lourie, that a series of long-chain aliphatic compounds with terminal guanidine or amidine groupings had this action, the optimal activity being reached with a straight chain of eleven methylene groups. Later it was found that *iso*-thiourea groups at the ends of such a chain were also effective in imparting the trypanocidal action. The lethal effect was not specific for trypanosomes, but certainly extended to some other pathogenic protozoa, since Dr. Lourie and Professor Yorke found that the undecamethylenediamidine would cause the disappearance of malaria parasites from the blood of a human patient during a febrile paroxysm; and later Dr. J. D. Fulton, working in association with Sir Rickard Christophers at the London School of Hygiene and Tropical Medicine, found that the diamidine compound had a striking effect in clearing parasites from the blood of *Macacus rhesus*, infected with a monkey malaria which (in default of treatment) is always rapidly fatal in that species.

Possibilities of Complex Cyclic Amidines

Although this straight-chain diamidine showed such promising results in laboratory experiments, the margin between the curative and toxic doses was narrow. There was, however, a wide field of possibilities open to exploration in the hope of finding an equally curative but less toxic substance. Dr. King has found that more complex cyclic amidines, such as glyoxalines, glyoxalidines and thiolglyoxalines, can be used as terminal groups to produce trypanocidal compounds; and, further, that the long chain of methylenes uniting such groups can be replaced by ring-structures of comparable dimensions, such as naphthalene or diphenylmethane nuclei. The number of conceivable variations of such structure is almost indefinitely large, and it is to be hoped and expected that the research facilities of scientifically organised industry will be used for a full exploration of its possibilities, so as to afford the maximum chance of the early discovery of a substance of this general type, showing the optimal development of the promising therapeutic properties already revealed.

Research in the Malaria Research Unit at the London School of Hygiene and Tropical Medicine during the past six years has been mainly concerned with the study of the chemotherapy of malaria and especially with the biochemical mechanism by which antimalarial drugs bring about their effect. It would appear from work so far carried out that the curative action of the usual type of antimalarial drug, whether of natural origin (e.g. quinine and other cinchona alkaloids) or synthetic (e.g. atebrin or plasmoquin) depends in the first instance upon the existence of a combining group in the molecule which is of a basic nature. It is probable that the strength of this basic group (or groups) is of therapeutic importance, and one line of work has consisted in the measurement of the dissociation constants of a number of known antimalarial compounds and other bases in this connection. It is of interest that the remaining portion of the molecule need not be of the benzene ring type, as in quinine, but, as shown in some recent observations by Yorke and others, may be of the aliphatic carbon chain type, provided that it contains sufficient carbon atoms to make it effective. Further, there is evidence favouring the view that the effectiveness of known antimalarial compounds may be related to their property of inhibiting enzyme action. Whilst observations of inhibitive effect under *in vitro* conditions have not actually established such a relation to therapeutic effect, they have shown that there is a distinct parallelism in the two phenomena.

Research into the natural occurrence and mode of action of vitamin C has been continued by Dr. S. S. Zilva and his assistants at the Lister Institute of Preventive Medicine. Results of work do not substantiate the assertions that *l*-ascorbic acid possesses antitoxic properties in diphtheria.

During the last few years it has been established by several workers that the oxidation of *l*-ascorbic acid can be catalysed by visible light in the presence, but not in the absence, of certain sensitisers. Dr. Zilva and Dr. A. E. Kellie have found that *l*-ascorbic acid, but not dehydroascorbic acid, undergoes photochemical decomposition when exposed to light of the ultra-violet region of the spectrum. Such decomposition can take place without the intervention of a sensitiser and in the absence of oxygen. The mechanism of this photolysis of *l*-ascorbic acid seems therefore to differ from that of the decomposition of the vitamin by visible light in the presence of sensitisers.

Continuing the investigation of the enzymic oxidation of ascorbic acid, Dr. Zilva and Mr. G. A. Snow studied the specificity of the ascorbic acid oxidase. They were able to show that the action of the enzyme was not confined to ascorbic acid and its analogues but that it was also capable of oxidising other dienols, cyclic or acyclic. A careful study, however, of the kinetics of this enzyme has revealed that it possesses a marked capacity to act in dilute solutions of ascorbic acid as compared with other substrates. This observation is of interest since vitamin C is present in plants in very low concentrations. It was further found that dialysed cucumber juice, which was shown by Dr. Zilva and Dr. Johnson to contain ascorbic acid oxidase, was also capable of oxidising glutathione and cysteine. The enzyme responsible for this oxidation appears, nevertheless, not to be identical with the ascorbic acid oxidase.

Vitamin C in Apples

Reference has been made in previous reports to the researches of Dr. Zilva, with Dr. F. Kidd and Dr. C. West of the Low Temperature Research Station at Cambridge, on the equilibrium between *l*-ascorbic acid and its reversibly oxidised form during the development of the apple. The work has now reached a stage at which the following points emerge. The fruits in the early stages of development contain only about 50 per cent. of vitamin C as *l*-ascorbic acid, the remainder being present as dehydroascorbic acid (the oxidised form). As the fruit grows, the proportion of the reduced form of the vitamin increases until, in the mature fruit, it is found almost entirely as *l*-ascorbic acid. Similar changes are observed when the intact fruit is heated so as to destroy the phenolase which is responsible for the oxidation. This fact suggests, in all probability, that the oxidation of the vitamin does not take place after the disintegration of the tissue in the process of analysis, but that the vitamin is present in the oxidised form during life and that the change in the equilibrium of the two forms is associated with some metabolic process related to the growth of the apple.

Attempts made by Dr. Zilva and Mr. T. N. Morris, of the Low Temperature Research Station, to increase the potency of canned apples by adding the extract of the peel (which is antiscorbutically more active than the pulp) have not been successful.

Toxic Gases in Industry

Detection of Sulphur Dioxide and Benzene Vapour

THE Department of Scientific and Industrial Research has issued two further leaflets in the series describing standard methods for the detection of poisonous gases produced in industrial processes. These deal with sulphur dioxide and benzene vapour respectively.

In the leaflet on sulphur dioxide (Methods for the Detection of Toxic Gases in Industry, Leaflet No. 3, Stationery Office, 2s. 6d.), it is pointed out that the situations where this gas may be encountered in possibly dangerous concentrations include bone and glue works, cold storage and refrigeration plant, dye-making, dyeing and bleaching works, glass and pottery works, ore roasting (metallurgical works), petroleum refining works, rubber works, sulphuric acid works, and tanneries. It is also encountered in fumigation and disinfection.

A concentration by volume of one part in 2,000 is dangerous for even short exposures and one part in 100,000 is the maximum concentration allowable for several hours' exposure. The standard method developed for the detection of this gas depends on drawing a sample of the atmosphere by a hand-pump through test-paper treated with starch and potassium iodate to which potassium iodide has been added. The test-paper becomes stained a brownish colour and the concentration is determined by comparing the stains with a standard colour chart supplied with the leaflet. Concentrations down to one part in 250,000 can be estimated by making not more than ten strokes with the hand-pump. Complete instructions for carrying out the test are given in the leaflet.

Chemical Test for Benzene Vapour

Benzene (or benzole) is dealt with in Leaflet No. 4 (Stationery Office 3d. no standard colour chart being necessary in this case). Benzene vapour is produced during the manufacture of coal gas and the distillation of coal tar. It may be encountered in dangerous concentrations in many industrial situations including aeroplane works, cellulose paint, lacquer and leather cloth works, dyestuffs and intermediate works, explosive works, fat and glue works, gas works and coke ovens, linoleum works, motor fuel blending works, paint and varnish works, pharmaceutical and perfumery works, rubber works, spray-painting works, and tar distilling works.

In high concentrations benzene vapour acts as a narcotic (acute poisoning). In low concentrations over a prolonged period it affects the blood and the blood-forming organs of the body (chronic poisoning). Individual susceptibility is well recognised, women and young persons being particularly liable to suffer from chronic poisoning. Analyses of air in factories where poisoning has occurred give values ranging from 1 to 200 to 1 in 500 parts of benzene.

The chemical test recommended in the leaflet is capable of detecting concentrations down to 1 part in 10,000. The test involves the absorption of benzene vapour in concentrated sulphuric acid containing a trace of formaldehyde. An orange brown colour is produced, even traces of benzene being sufficient for this result. The test is carried out by drawing a sample of the atmosphere under test through a tube containing the reagent by means of a hand-pump of definite capacity, and determining the number of strokes required to produce a certain standard depth of colour. From the number of strokes of the pump required to produce the standard colour, the concentration of benzene vapour present is obtained by reference to the table given in the detailed instructions in the leaflet.

A foreword to the leaflets explains that a paragraph of the Chemical Works Regulations, 1922 (made under Section 79 of the Factory and Workshop Act, 1901) prohibits entry into any place which might contain dangerous gas by any person not properly protected until the air has been tested and found safe to breathe. To meet this requirement the question of simple and rapid chemical or other methods for determining low concentrations of dangerous gases, such as may occur in various circumstances in industrial works, was discussed by the Association of British Chemical Manufacturers with the Home Office and as a result arrangements were made by the Department of Scientific and Industrial Research, at the request of the Home Office and with the financial and technical co-operation of the Association of British Chemical Manufacturers, for a series of tests to be developed by the Chemical Defence Research Department.

The programme allows for a complete series of tests dealing with the following gases and vapours: aniline, arsine, benzene, carbon disulphide, carbon monoxide, chlorine, hydrogen cyanide, hydrogen sulphide, nitrous fumes, organic halogen compounds, phosgene and sulphur dioxide.

THE Compagnie de Synthese et Fermentations has been founded with a capital of 2 million francs and will be interested in the development of a variety of chemical processes including those relating to synthetic fuel. Among the concerns participating in the enterprise are the Mines Domaniales de Potasse d'Alsace, the Soc. Française Industrielle et Commerciale de Pétrole.

[By courtesy of the Widnes Foundry and Engineering Co. Ltd.

A group of nickel cast iron caustic pots and similar castings for chemical equipment.

Commerce and Industry

Sir Ernest Benn Reviews Conditions in 1938—The Need for Freedom in Trading

SIR ERNEST BENN, the chief proprietor of THE CHEMICAL AGE, presided at the 98th annual meeting of the United Kingdom Temperance and General Provident Institution in London on Wednesday. In a review of 1938 Sir Ernest Benn said that it had been a remarkable year, exhibiting on the one hand serious political strain and on the other exceptional commercial and industrial strength. Gas masks and confidence hardly went together, but their wonderful workers of all grades and classes brought out of their personal reserves a dogged determination to carry on. The nation maintained all but a fraction of its previous record in the numbers employed. More than 12,000,000 insured workers remained in work, and the total of those who were in gainful occupations could not be less than one-third of the whole population, very near indeed to saturation point. They were apt to devote too much time to the discussion of their troubles and far too little to the contemplation of their blessings. For example, while they had had ample cause for fear of strife abroad they had overlooked their new found freedom from the risks of strife at home. They continued to deplore the existence of a good deal of unemployment, but that trouble could not be justly laid to the charge of their industries. Millions of women who before the war took a different view of their duties to Society now competed in the labour market. Emigration had almost ceased. With woman in her pre-War place and emigration at its pre-War level they would today be faced with a very serious labour shortage. Again all experience showed that employment and income-tax were closely related. In three years 2s. in the £ had been added to the tax on the profits of industry—1s. on the income-tax and another 1s. for the National Defence Contribution. Judging from past experience such a drastic and rapid increase in the tax burden should have added much more to the toll of unemployment than had in fact been done.

The Menace of the Daily Newspaper

Commerce and industry had always suffered the handicap of politics, but in modern times a serious new barrier to peace and prosperity had arisen in the shape of an enormous expansion of the machinery for the distribution of news. The business of news gathering and news distribution, on paper and on the air, must now be ranked with the greatest of our industries. In this country alone it employed more than £100,000,000 of capital; there was a daily newspaper circulation of 30,000,000 copies; and there were nearly 9,000,000 wireless licences. To remember that the whole of this impressive structure was absolutely governed by the very human preference for bad news was to realise one of the difficulties of a peace making Prime Minister and the jeopardy in which quiet and confidence always stood. He feared that to preach good-will to the news trade, the bad news trade as it must be called, was something like advocating teetotalism to brewers. But a more general understanding of this difficulty was one of the most urgent of present day needs.

He thought the story of the Stock Exchange in 1938 gave further proof of the nation's strength and staying power. He could find no cause for pessimism in our having lost foreign funds, chiefly because of returning confidence in France and America. Some of the shrinkage in Stock Exchange values must be due to Jewish liquidation, caused by the appalling happenings in Central Europe. There could surely be few remaining risks from the investment point of view which had not been adequately discounted except one. That was the tendency of the bureaucratic grip upon their activities to tighten. If Chambers of Commerce, farmers, ship owners, and others continued to demand Government assistance in fields where Government was out of place, that grip must get tighter still. There were those who held that confidence and management could go together. To his mind the two things were wholly incompatible, and he believed that the rapid development of the new science of management as exemplified in the Exchange Equalisation Fund and recent legislation was in part responsible for the continued weakness of confidence. The ordinary man rightly shrank from a market where the largest and most powerful operator was a newcomer, full of theories but devoid of experience, whose avowed object was not to secure income or to make profit, but simply to defeat the law of supply and demand. The continued shrinkage of trade between the nations of the world gave emphasis to this argument. At no time in history had Governments lent so much of their aid to the business of exporting, and yet exports everywhere continued to decline to respond. The best hope for world trade lay in the re-establishment of the merchant who knew that trade consisted in buying as well as selling, and that the buyer both here and abroad was seldom interested in trade agreements, in quotas, in balance of payments, or even in Empires.

The merchant also, from his long experience, was in that small minority who could understand the old, hard unpopular economic truth that the buyer settles the price. There was now more talk of organising industries to sell by the Cartel method, thus introducing still more red tape where the only need was freedom. Block sales and purchases such as they heard of from Germany might look good from the inside of a Government department, but they ignored the taste and convenience of the real buyers. They also made no use of all the wisdom and experience of the merchant, the wholesale or the retail trader who, by their knowledge of the consumer and his ways had steadily raised the standard of living of all of them.

Sir Ernest Benn was able to report that the total of the new policies written by the United Kingdom Provident Institution during 1938, exceeded for the second time the sum of £5,000,000, and improved upon the record figure established in 1937. Another record for the year was that for the first time the normal annual addition to the Life Assurance Fund had reached the seven figure mark.

THE ANNIVERSARY MEETINGS OF THE CHEMICAL SOCIETY

The anniversary meetings of the Chemical Society this year are to take place in London on March 29, 30 and 31. On March 29 the Rutherford Memorial Lecture will be delivered by Sir Henry T. Tizard, K.C.B., F.R.S., at the Royal Institution at 5 p.m., and Fellows and guests will be entertained at a reception and dance at Imperial Chemical House from 8.45 until midnight.

On Thursday, March 30, visits have been arranged in the morning to Bedford College for Women and to the Wellcome Research Institution, to view the laboratories and museums. The annual general meeting will be held at Burlington House at 2.30 p.m., and at 4 p.m. the presentation of the Longstaff medal and of the Harrison memorial prize will be made and Professor F. G. Donnan will give his presidential address. The anniversary dinner of the Society will be held at Grosvenor House the same evening at 7 for 7.30 p.m.

On Friday, March 31, visits have been arranged in the morning to The British Drug Houses, Ltd., and to the Central Laboratories of the Shell Marketing Co., Ltd., and in the afternoon to the Research and Development Department of the Distillers' Company, Ltd., at Epsom, and to the Laboratories of the Research Association of British Paint, Colour and Varnish Manufacturers.

NEW TECHNICAL BOOKS

A COURSE IN CHEMICAL SPECTROSCOPY. By W. H. Thompson, B.Sc., M.A. Pp. 94. London: Oxford University Press. 6s.

Anyone who expects to find the words of the preface borne out in the text of this book is likely to be considerably surprised for whatever its merits or demerits may be we cannot agree that the work is "based upon an *elementary* laboratory course in chemical spectroscopy." In actual fact the course is definitely advanced both in theory and in practice as a glance at the various experimental details will quickly show. There are eight experiments in all, and they are as follows: work on the principal lines in atomic spectra, ultra violet spectra, arc spark and flame spectra, the general features of the molecular spectra, rotational structure of a band in a molecular spectrum, absorption spectra of molecules, predissociation spectra and finally the structure of an infra red absorption band showing alternating intensities and the deduction of molecular structure. There is certainly nothing elementary about the foregoing! Coupled with all this is the fact that the mathematical side of the subject is much developed, and though the theoretical elucidation of emissority is no doubt up to date and true as far as our present knowledge goes, it does tend to take up much of the space which one feels should have been used for more detailed description of experimental procedure. Having said so much it is pleasant to record satisfaction at many admirable hints and working suggestions interspersed in the text, and especially for the notes on general experimental procedure which introduce the experiments themselves. Despite the fact that Mr Thompson obviously intends his book to be up to date there are one or two rather startling omissions, principal among which is the absence of reference to Niels Bohr. Surely such a pioneer of modern spectroscopy should have had almost a chapter to himself. On the experimental and apparatus side the work of Twyman might have been mentioned, although it is satisfactory to be able to state that the author is exclusively in favour of British spectrographic and allied apparatus.

Finally, one is rather puzzled to find no reference to the use of the spectrograph in industry. It may be urged that this is not a book about industrial work, but the title leads one to infer that chemical spectroscopy as a whole will be touched upon. This aspect of the subject is of such increasing importance that the student would be well advised to make himself familiar with the *practical* application of the work of Bohr, Fowler and others.

The illustrations are excellent, especially the photographic reproductions of spectra, but some of the diagrams need more explanation than is afforded. For instance Diagram 3 shows the constant deviation prism divided into three parts. This is all right as an explanation of the inner working of a remarkable piece of apparatus, but nowadays the prism consists of one solid block of glass, and this should have been stated. Problems based upon the various types of measurement are also included. These also are far from "elementary."

THE PHASE RULE AND ITS APPLICATIONS. English edition, by Alexander Findlay, revised with the assistance of A. N. Campbell. Pp. 327. London: Longmans, Green and Co. 12s. 6d.

In this new edition the opportunity has been taken of discarding or re-writing certain sections which have become somewhat obsolete, and of correcting data in the light of more recent investigation. Bibliographical references, also, have been brought up to date. As a result of the now widespread familiarity with the methods of practical physical chemistry and to the existence of special books on this subject, the appendix, dealing with the experimental determination of the transition point, which had been brought forward from the early days of the first edition, has now been dropped. The importance of the X-ray technique in the investigation of the nature of solid and liquid phases has been stressed throughout, while the treatment of controversial

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Professor as Cartoonist

Humours of Club Life

IN the memoir of the late Professor Arthur Smithells, published in THE CHEMICAL AGE of February 11, reference was made to his ability as a cartoonist. Mr. John Benn described how the professor used to enliven the committee meetings of *Discovery* by his amusing portraits, often drawn on the blotting paper. In an appreciative letter Mrs. Smithells has since sent Mr. Benn some further examples of her husband's work, including a series of sketches entitled "Club Life among the Septuagenarians." The incidents depicted include the embarrassment of the professor when, having been "talked across" at some length by two eminent scientists, each subsequently drew him aside to inquire "who *was* that fellow I've just been talking to"! One of the cartoons in this Septuagenarian series is reproduced here, with the caption indicated.

"Professor Fitten Bright recommending his contemporaries to go and do as he has done. He has been overhauled thoroughly by a doctor who found that all his organs were in first-class condition, his arteries those of a man of 40, his blood pressure normal, sight and hearing remarkable for a man of his years."

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subjects, such as intensive drying, has been modified in relation to recent experimental work.

REVISION NOTES IN ORGANIC CHEMISTRY. By E. P. Wilson and F. W. Ambler. Pp. 240. London: William Heinemann, Ltd. 4s.

In preparing these notes for pupils up to higher school certificate standard, an attempt has been made to present a course containing all the facts and explanations of importance, but with a minimum of discussion. It is intended that the book should be used at the end of a course based on standard text-books. Assistance in revision is afforded by the arrangement of the matter, where possible, in note form and by the provision of summaries which help to stress comparisons and contrasts. Questions are given at the ends of the chapters both to assist the student in his revision and to indicate the type of questions set in the various examination papers.

"Incalculable Advantage" of Five-Day Week

Lord Perry's Views

As already announced in THE CHEMICAL AGE, *the proprietors, Benn Brothers, Ltd., will celebrate next month the twenty-first anniversary of the five-day week, which they introduced in 1918. In the following article Lord Perry, the chairman of the Ford Motor Co., Ltd., of Dagenham, gives his views on the five-day week and the movement for shorter hours in industry.*

Born in the years of post-war depression, the movement to establish a five-day week has made regrettably slow progress, and is still in its early infancy. There have been times when hopes ran high and we had visions of rapid strides along the path of progress; but bitter experience soon taught us to view these with deep suspicion and to be content with a slower but steadier form of evolution.

I should be the last person to deny that much has been achieved. The five-day week may have been born of necessity in time of depression; but when recovery years set in the movement gained a new air of respectability. Short time, hitherto an accident of industrial idleness, became an organised institution, and it was not long before the forty-hour week attained world-wide recognition as a goal to be achieved when economic conditions might prove favourable.

There is no need for me to recapitulate its history in detail, but a few examples may be taken at random to illustrate the diversity of its progress. It was introduced into Italy in 1934, and in the same year many of the industrial codes under the National Recovery Administration in the United States included the forty-hour week among their provisions. In spite of the fact that these codes were later declared to be unconstitutional, this particular provision has, I understand, in many cases remained in force. In 1936 France, Spain and New Zealand introduced the forty-hour week, and in that year many people were, not unreasonably, very optimistic over the excellent progress that was being made.

Recent history has shown that such optimism was somewhat premature. With the lifting of the depression and the world-wide race for armaments, the five-day week has often had to bow before the storm of ever-accelerating production. This has been noticeably the case in the totalitarian States. France, too, has been forced to modify very considerably the laws introduced by her Socialist administration. Elsewhere, however, in more peaceful and less disturbed corners of the world the movement has continued to prosper, and encouraging reports have been received in recent years from countries so far removed from each other as Australia, Belgium, Poland and Mexico.

We in this country have no cause to be particularly proud of our achievements in this field. With none but the most lukewarm encouragement from official quarters, the movement has been forced to rely entirely on its own strength, and has succeeded only where individual employers have had the courage and the discernment to establish a forty-hour week on their own initiative.

What is the reason for this? It is strange that so many of the old prejudices still remain to obscure the obvious advantages of such progressive development, and also that the movement is not more popular amongst employees—for by no means all the opposition has come from the employers' side.

I myself have been associated for a great many years with the practical operation of a five-day week of forty hours, and have found therein nothing but good. Many of the familiar arguments against it—that it must result in decreased output and increased cost of production, that it must be established simultaneously throughout an industry—I know to be fallacious. On the contrary, it has been my experience that the benefits accruing to the workers are so important and so far-reaching in their effects that they easily outweigh what would

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appear to be the more obvious outcome of a reduction in working hours.

Consider the matter for a moment from the worker's point of view—from a social and humanitarian viewpoint. The leisure enjoyed by a man who ends his week's work on Friday afternoon gives time and opportunity to develop a social and cultural life outside factory or office. Is it not obvious that this is not only an incalculable advantage to him personally, and through him to the community in general, but also that it must be reflected in his work and the outlook and spirit he brings to it?

I am more and more convinced that the five-day week is an institution which can only lead to the social and economic betterment of the country and indeed of the world. Much of the opposition to it is borne of fear and ignorance. It must be the task of all who have seen the five-day week in operation, and who are desirous of seeing its further establishment, to do all in their power to make more widely known the advantages they have experienced and know to be real. Only in this way can the movement hope to make the rapid headway we are so anxious to see.

RECENT TRADE LITERATURE

Bulletin No. 3800 issued by the DENVER EQUIPMENT CO., Denver, Colorado (London branch at 840 Salisbury House, E.C.2) contains a detailed list of plant and equipment manufactured and supplied by the company. These include agitators, ball mills, classifiers, filters, mills, pans, pumps and a variety of laboratory equipment. The bulletin contains also flowsheets of operating plants.

The recently published number of the Sulzer Technical Review, organ of SULZER BROS. (LONDON), LTD., contains an article which gives information concerning the Sulzer mechanical equipment for coal hydrogenation plant. Other articles deal with a large Diesel-engined power station for a petroleum refinery in France, and a concentrating plant for preserving cider. There are also notes on pumping installations supplied to Columbia and England, high-pressure steam boilers in Japan, refrigerating plant for an abattoir in France, etc.

When corrosive gases are being handled, the ordinary draughting fans, such as are used for building ventilation, marine work, air heating systems, etc., are unsuitable and are quickly corroded and destroyed by even a trace of acid gas. THE KESTNER EVAPORATOR AND ENGINEERING CO., LTD. claim to have produced a range of fans to meet the most arduous conditions by using materials resistant to the action of the particular gas required to be handled. For example, for chlorine they use Keebush; for sulphuric acid gas, lead or lead alloy; for nitric acid gas, stainless steel. Whatever the material, however, the general design is similar in principle. These fans, both low pressure and high pressure types, are described and illustrated in leaflet No. 257 issued by the company.

CROFTS (ENGINEERS), LTD.'S latest variable speed pulley catalogue VP338 fully describes these compact devices. The V/S pulleys are standardised in a wide range of sizes to meet industrial requirements, and when fixed to the motor shaft enable infinitely variable speeds to be obtained within the limits of the pulley sizes. Powers are up to a maximum of 60 h.p. Tables listed in the catalogue enable easy selection to be made of complete drives for ratios up to 3 to 1; variable speed units are also listed which allow speed variation up to 4 to 1. For small power outputs the "Hiratio" units as shown are standardised for ratios up to as high as 45 to 1, although for special drives ratios up to 80 to 1 are obtainable. The company have issued another catalogue which deals with (JFS-Jr) vari-speed controls. This is a device which has certain special features. The control is fitted between the driving and driven machines, and utilising standard V ropes, obtains ratios up to 7½ to 1 and transmits powers up to 7½ h.p.

Personal Notes

MR. CARL ERNST JULIUS GOEDECKE, chemical manufacturer, of Dunham Maisey, Cheshire, has left estate valued at £22,627 (net personalty £18,036).

* * * *

MR. F. E. BOARD, of Cobden Board and Co., Sheffield, has become a director of Benzol and By-Products, Ltd., in place of Mr. G. Spencer, who has retired.

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MR. FRANCIS D'ARCY COOPER, chairman of Lever Brothers and Unilever, Ltd., underwent a further operation on Tuesday, and it is understood that his condition is satisfactory.

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MAJOR J. B. UPTON, a director of Reckitts and Colman, Ltd., has been appointed a special officer for the North-Western district in connection with the Government's National Service campaign.

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PROFESSOR F. G. DONNAN, F.R.S., will preside at the anniversary dinner of the Chemical Society at Grosvenor House on March 30, when Viscount Samuel and Professor Doctor Ernest Cohen (foreign member of the Royal Society) of Utrecht, will be among the principal guests.

* * * *

MR. J. C. RODGER, assistant manager at the Cordale Dyeworks, Renton (Dumbartonshire), of the United Turkey Red Co., Ltd., Glasgow, was recently made a presentation by the foremen and staff on the occasion of his retirement. Mr. Rodger has been in the service of the United Turkey Red Co. for 50 years.

* * * *

DR. DONALD DEXTER VAN SLYKE, research chemist of the Rockefeller Institute for Medical Research, New York City, has been awarded the Willard Gibbs medal of the Chicago section of the American Chemical Society for 1939, one of the highest scientific honours bestowed in the United States. Dr. Van Slyke is an authority on the chemistry of proteins, enzyme action, blood chemistry, and the metabolic conditions of diabetes and nephritis.

OBITUARY

MR. DUGALD S. GILLESPIE, late managing director of the National Asphalt and Concrete Co., Ltd., Glasgow, died last week.

* * * *

MR. HARRY TALBOT STEVENSON, a director of the firm of Francis Stevenson and Sons, Ltd., Lawside Dyeworks, Milton Street, Dundee, died last week at the age of 62.

* * * *

MR. ALBERT SENIOR, local director of Thos. W. Ward, Ltd., of Sheffield, suppliers of second-hand chemical plant and machinery, has died at Sheffield, at the age of 53.

* * * *

MR. RICHARD LEIGH, for many years chairman of R. and H. Leigh and Sons, Ltd., carboy hamper manufacturers of Bolton, has died at Windermere, at the age of 92. In 1876 Mr. Leigh invented and marketed the first carboy hampers of metal, which rapidly began to take the place of the willows in universal use at that time. In the eighties, Mr. Leigh was in personal touch with most of the large chemical manufacturers of the country, when each was a separate firm and when business generally was conducted by the owners personally. During the greater part of the War, from 1915 to 1919, Mr. Leigh was Chairman of St. Annes-on-the-Sea Urban District Council until the formation of the Borough of Lytham St. Annes, when he became one of the first aldermen. He was made a county magistrate in 1917. Mr. Leigh was keenly interested in photography, an Honorary Fellow of the Royal Photographic Society, and for many years the senior member of the Society. His business is now carried on by his younger son, Mr. Norman Leigh, under the title "Leigh and Sons Metal Works."

TO-DAY'S ANNIVERSARY

HENRI ETTENNE SAINTE-CLAIRE DEVILLE, the discoverer of nitrogen pentoxide (1849), was born in the West Indies, March 11, 1818. He developed technical processes for the production of sodium, aluminium and magnesium, and also worked on crystalline boron and silicon, and certain artificial minerals for the production of which he had to develop high temperature technique. In 1875 he achieved the fusing of platinum on a commercial scale, using the oxy-hydrogen blowpipe. In 1857 he showed that ammonia and hydrogen chloride can exist at high temperature, side by side, without combining. In 1841 he obtained toluene by the distillation of balsam of Tolu; it was seven years later that C. B. Mansfield, a pupil of Hofmann, isolated toluene from the "light oil" of coal tar by fractional distillation, then introduced for the first time. Deville also focussed his attention upon chemical changes which could be brought about by heat and reversed on cooling. Using special apparatus he was able to study the dissociation of steam, carbon dioxide, sulphur dioxide and hydrogen chloride at high temperatures.

Foreign Chemical Notes

Holland

AN EXPERIMENTAL PLANT FOR CASEIN WOOL MANUFACTURE is in operation at a condensed milk factory in Leeuwarden (Friesland), the material being marketed under the name of Casolana.

Switzerland

THE CIBA COMPANY is introducing a new series of cellulose solvents which include trimethylamine, triethylamine, tripropylamine, monomethyl diethylamine and dimethyl-cyclohexylamine.

France

ORTHO-OXYQUINOLINE SULPHATE is now being successfully used to combat plant spores and mycelium under the trade-name of Cryptonol.

MAGNESIE ET DOLOMIE DE FRANCE, capital 15 million francs, has been formed for the purpose of manufacturing mainly refractory materials on the basis of dolomite and synthetic magnesia.

Hungary

THE EXPERIMENTAL STATION NOW STUDYING THE POSSIBILITY OF ISOLATING CELLULOSE from maize stalks estimates the available supply of this raw material at 3 million tons per annum, of which 10 per cent. would meet the cellulose requirements of the country. Moreover, a fertiliser obtainable as a by-product in the production of maize-stalk cellulose is reported to lead to a 30-40 per cent. increase in beet and maize output.

Italy

THE ACNA CONCERN OF MILAN is building a vinyl chloride resin plant at Cesano Maderno.

BENZYL CELLULOSE AND ETHYL CELLULOSE are to be manufactured in a new plant of the Fabbrica Italiana Prodotti Speciali at Turin.

THE STABILIMENTI DI RUMIANCA (TURIN) at Pieve Vergonte (Novara) are erecting a plant for the production of metallic arsenic, arsenic chloride, arsenic sulphide and mercury arsenate.

LARGE QUANTITIES OF CAFFEINE are now being recovered from coffee residues. Other fine chemicals now produced in Italy on an extensive scale are adrenaline, *p*-aminobenzoic acid-N-diethylamino-ethyl ester hydrochloride, *p*-acetphenetidine and resorcinol.

References to Current Literature

Inorganic

Oxidation of phosphorus by carbon dioxide. Emmett and Schult, *Ind. Eng. Chem., 31,* 105-111.

Lead oxides. Clark and Tyler, *J. Amer. Chem. Soc., 61,* 58-65.

Liquid hydrochloric acid: manufacture and uses. Schwabe, *Chem. Fabrik, 12,* 49-51.

Hydrogen, oxygen and chlorine by electrolysis. Fischer, *Chem. Fabrik, 12,* 69-74.

Organic

Esters of sodium sulpho-succinic acid. Caryl and Ericks, *Ind. Eng. Chem., 31,* 44-51.

Hydrogenation-cracking of diphenylene oxide and related compounds. Hale and Cawley, *J. Soc. Chem. Ind., 58,* 7-13.

Pectin gels. Lampitt and Money, *J. Soc. Chem. Ind., 58,* 29-32.

Arsonium compounds. Blicke, Willard and Taras, *J. Amer. Chem. Soc., 61,* 88-90.

Isopropylene barbituric acids. Cope and Hancock, *J. Amer. Chem. Soc., 61,* 96-98.

Action of caustic alkali and of alkaline salts on alcohols. Reid, Worthington and Larchar, *J. Amer. Chem. Soc., 61,* 99-101.

Catalytic hydrogenation of phenol under high pressure. Ando, *J. Soc. Chem. Ind. Japan, 41,* 386-390 B.

Free radicles in organic reactions. Wittig, *Angew. Chem., 52,* 89-96.

Analysis

Photoelectric methods in analytical chemistry. Müller, *Ind. Eng. Chem. analyt. ed., 11,* 1-17.

Determination of fluorine. Reynolds and Hill, *Ind. Eng. Chem. analyt. ed., 11,* 21-27.

Determination of active ingredients and fatty matter in surface-active agents. Hart, *Ind. Eng. Chem. analyt. ed., 11,* 33-34.

Semi-micro method for determining carbon and hydrogen in organic compounds. Ingram, *J. Soc. Chem. Ind., 58,* 34-37.

Colorimetric determination of small amounts of nitrates. Sallinger and Hwang, *Z. analyt. Chem., 115,* 174-177.

Titrimetric determination of organo-lead compounds. Hein, Klein and Mesée, *Z. analyt. Chem., 115,* 177-183.

Colour reagent for lead and its use as indicator. Evans, *Analyst, 64,* 2-14.

Quinaldic acid as reagent for copper, zinc and cadmium. Shennan, *Analyst, 64,* 14-16.

Determination of heavy metals in water. Abrahamczik, *Mikrochem., 25,* 228-241.

Mineral Oils, Gas, Tar

Iodine number of petrols. Richter, *Oel u. Kohle, 15,* 69-75.

Catalytic aromatisation of aliphatic hydrocarbons. Koch, *Brennstoff Chem., 20,* 1-9.

Fine distillation of hydrocarbon mixtures. Bruckner, *Brennstoff Chem., 20,* 9-10.

Treatment of shale oil by hydrogenation. Pier, *J. Inst. Petroleum Techn., 24,* 692-705.

Tetraethyl lead susceptibilities of gasoline. Henderson, Ross and Ridgway, *Ind. Eng. Chem., 31,* 27-30.

Cellulose, Paper

Solubility of celluloses in alkali lyes. Staudinger and Jurisch, *Kunstseide u. Zellwolle, 21,* 6-9.

Rate of xanthation of soda cellulose. Scherer and Miller, *Rayon Text Monthly, 20,* 24-25.

Continuous preparation of alkali cellulose. Monterra, *Rev. Univ. Soie Text. Art., 13,* 517-525.

Hemicellulose from plant materials. Yanovsky, *Ind. Eng. Chem., 31,* 95-100.

Fibrous acetone-soluble acetyl cellulose. Sakurada and Morita, *J. Soc. Chem. Ind. Japan, 41,* 385-386 B.

Bleaching, Dyeing, Finishing

Urea and formaldehyde. Warwick, *Text. Colorist, 61,* 17-18.

Sulphur brown. Karr, *Text. Colorist, 61,* 28-31.

Stability of hydrogen peroxide bleach solutions. Harold, *Amer. Dyestuff Reporter, 28,* 1-5.

Modern printing. Hasse, *J. Soc. Dyers Colourists, 55,* 6-11.

Chemistry of wool processing. Nüsslein, *Melliand Textilber. (English ed.), 20,* 17-22.

Surface active agents in dyeing. Smith, *Ind. Eng. Chem., 31,* 40-43.

Detergent properties of ether sulphonates. Van Antwerpen, *Ind. Eng. Chem., 31,* 64-66.

New processes for waterproofing textiles. **Burnand,** *Teintex, 4,* 27-33.

Glass, Ceramics

Particle size and plasticity of kaolinite. Whittacker, *J. Amer. Ceramic Soc., 22,* 16-23.

Sagger problems in the porcelain industry. Menyl, *Sprechsaal, 72,* 15-18, 31-33.

Coloured bodies in so-called carbon yellow glasses. Neumann and Dietzel, *Glastechn. Ber., 16,* 389-391.

Metals, Electrometallurgy

Alkaline plating solutions: anodic behaviour. Graham, *Metal Ind., 54,* 251-252.

Manufacture of duralumin. Sachs, *Metal Ind., 54,* 263-266.

Gold plating baths. Wogrinz, *Metallwar. Ind. u. Galvano-Techn., 37,* 33-35.

Physical methods in the chemical study of metals. Chevenard, *Chim. et Ind., 41,* 28-40.

Fats, Oils, Waxes

Polymerisation of drying oils under the influence of sulphur chloride. Kaufmann and Funk, *Fette u. Seifen, 45,* 670-674.

Air-oxidised linseed oil. Crebert, *Fette u. Seifen, 45,* 674-676.

Wij's method for determining iodine numbers. Vossgard and Bjösvick, *Z. analyt. Chem., 115,* 195-204.

Purification of talloil. Heller, *Chem. Ztg., 63,* 77-78

Paints, Pigments

Factory testing of paint and varnish products. **Plowman,** *Paint Varnish Prod. Manager, 19,* 12-13.

Colloids in the paint and varnish industry. Moore, *Paint Varnish Prod. Manager, 19,* 30-33.

Fast curing synthetic finishes. Bucy, *Metal Ind. (U.S.A.), 37,* 19-21.

Flow properties of paints. Kewish and Wilcock, *Ind. Eng. Chem., 31,* 76-83.

Iron blue. Ihne and Kanning, *Ind. Eng. Chem., 31,* 88-91.

Corrosion: application of priming coats without oil vehicles. Thornhill and Evans, *J. Soc. Chem. Ind., 58,* 13-16.

Rust-proofing and paint adherence. Chase, *Paint Techn., 4,* 7-10, 39.

Rubber, Resins, Plastics

Rubber vulcanisation accelerators: reaction of phenyl thiourea with carbon disulphide. Kawaoka, *J. Soc. Chem. Ind. Japan, 41,* 370-371 B.

Artificial wood masses without magnesium chloride. Rodt, *Chem. Ztg., 63,* 53.

Films and plastics of ethyl cellulose. *Rev. Prod. Chim., 42,* 65-69.

Styrene resins. Frydlender, *Rev. Prod. Chim., 42,* 69-72.

Swelling and solubility of high-molecular materials in organic solvents. Ostwald, *J. Oil Col. Chem. Assoc., 22,* 31-46.

Miscellaneous

Emulsions. Schollick, *Oil Col. Trades J., 95,* 647-651.

High vacuum distillation. Burch and Van Dijck, *J. Soc. Chem. Ind., 58,* 39-42.

General News——From Week to Week

THE ENGLISH STEEL CORPORATION, LTD., are planning extensions at their Attercliffe works.

STEEL MILLS OF THE SOUTH DURHAM STEEL AND IRON CO., LTD., Stockton-on-Tees, are to be put into operation again after being idle for a considerable time.

THE HEAD OFFICE OF JAMES KEITH AND BLACKMAN CO., LTD., makers of fans, is to be moved to Mill Mead Road, Ferry Lane, Tottenham, N.17, as from March 13.

THE ANNUAL REPORT of the National "Safety First" Association shows that through the Association's industrial members safety propaganda reaches over 1,000,000 workers. Over 250,000 safety posters were issued and distributed during 1938.

ON THE RECOMMENDATION of the Import Duties Advisory Committee the Treasury has decided to exempt ouricury wax under the Import Duties Act, 1932. Ouricury wax is now being used as a raw material in the manufacture of boot and floor polishes in partial replacement of candelilla wax and carnauba wax.

NEW INDUSTRIES ALREADY NEGOTIATED IN HULL THIS YEAR include brickmaking and a large plant for the Wolman process of preserving timber. The Hull Development Committee report active inquiries for extracting oil from industrial residues, and a further inquiry for the establishment of an industry allied to the existing seed crushing trade.

THE TREASURY have made an order under Section 10(5) of the Finance Act, 1926, exempting maleic acid and maleic anhydride from Key Industry Duty from March 8, 1939, until December 31, 1939. Copies of the Treasury order, which is entitled "The Safeguarding of Industries (Exemption) No. 1 Order, 1939," may be obtained from H.M. Stationery Office.

FIRTH-VICKERS, LTD., HAVE PRODUCED A NEW ALLOY STEEL claimed to have exceptional heat- and scale-resistant qualities. The subject matter of the patent application which has been made is: "improvements in or relating to alloy steels; an austenitic alloy suitable for constructional material for use at high temperatures."

SPEAKING AT THE ROYAL TECHNICAL COLLEGE, GLASGOW, on March 2 to members of the Glasgow Section of the Society of Chemical Industry, Dr. I. Vance Hopper, chairman of the Section, said that the country needed to make full use on the administrative side of the resources of all the sciences. Education in science should supply leaders in industry. There were two kinds of scientifically trained men who could serve the community. There was the experimentalist and there was the complementary type more capable of administration and of maintaining the position of science before the public. The present type of University training often failed to produce this latter kind of person. They required to live down the suggestion that a scientific training made a man incapable of holding an executive position. Universities should cater for the production of the "literary" type of scientist, capable of self-expression and of communication with his fellows in other fields. Such men could form the spearhead of their profession on the side of public relations.

THE COUNCIL OF THE RESEARCH ASSOCIATION of British Paint, Colour and Varnish Manufacturers has issued a bulletin on the "Decoration of New Plaster and Cement" which is the third of a series being issued by the Council on practical problems of painting. The present bulletin has been contributed by the Building Research Station and is issued from the Paint Research Station from where it can be obtained price 1s. It embodies the views held by the two organisations, recorded in the light of available knowledge. In it, it is pointed out that while other materials, such as wood, may sometimes contain sufficient moisture to cause defects in applied coatings, plaster and cement, except when precast, invariably and necessarily contain large amounts of water when they are first placed in a building and are usually applied to fairly massive porous backings which are also in a wet condition. The bulletin explains the risks and indicates the precautions to take in decorating plasterwork before it is dry. The contents include chapters on special factors affecting decorations on plastered surfaces and requirements of individual plasters and cement.

A NEW FACTORY has been erected at Wittenberge for the production of cellulose wool from straw. It is said to be the first factory of its kind in Germany.

IN THE DESCRIPTION OF THE EXHIBITS of Boots Pure Drug Co., Ltd., at the Olympia Section of the British Industries Fair published in the February 25 issue, page 148, reference was made to a new product named Jecocin. This is a medicated *cod liver* oil and not a medicated castor oil as stated.

THE ROCKEFELLER FOUNDATION have granted £12,000 for researches on vitamins, sterols and related compounds, to be spread over seven years at the Imperial College of Science and Technology, London. The work will be carried out under the direction of Professor I. M. Heilbron, Professor of Organic Chemistry at the College.

STEEL AND IRON WORKERS will be the guests of Frederick Braby and Co., Ltd., structural engineers, Springburn, Glasgow, on March 11, when the centenary of the firm will be celebrated. The company has works in Glasgow, Falkirk, Motherwell, London, Liverpool and Bristol; the Glasgow works were started 64 years ago with 50 men, and now employs 1,700 men in 12 different departments.

PLANS FOR A BIG SCALE EXPANSION in sewage plant and works, rendered necessary by the extraordinary increase in area population, will be laid before Portsmouth City Council during this month. A report and recommendations as to scope and type of works required has been prepared. The new scheme provides for two new bacterial beds with component and auxiliary plant, and will enable an outlying works to be closed.

THREE MEN WERE FATALLY INJURED on March 1 while engaged on the erection of the new coke oven plant at the Clyde Iron Works of Colvilles, Ltd., Tollcross, Glasgow. The men were casting a concrete floor on the top of a coke oven hopper, one of a series of blending bunkers at present being erected for the new plant, when the shuttering collapsed without warning and the men fell to the bottom of the hopper, 60 feet below.

THE GIANT 126-FOOT DERRICK which has stood over the Anglo-American Oil Co.'s successful well at Dalkeith, Midlothian, for nearly a year, has been moved without dismantling, to a new bore 220 yards away. Now that the well produces between 350 and 500 gallons of crude oil per day the derrick is no longer needed there and a large pump has been erected at the head of the well. The company hope that a new oil pool will be found at their latest site.

A FURTHER INDICATION that the negotiations for a new quota agreement in the cement industry are now practically complete was provided at last week's meeting of Alpha Cement, Ltd., by the chairman, Mr. Albert Y. Gowen. He said that further co-operation between all cement manufacturers was desirable, and that he was hopeful that this co-operation would be forthcoming. He emphasised that the trade as a whole was faced to-day with a productive capacity considerably in excess of the present demand.

NEW TYPES OF PRODUCTION PRESSES and machines for finishing the edges of soap, and also a new type of hollow plate for drying soap are shown at the Leipzig Spring Fair held from March 5 to 13. The hot soap is placed on hollow plates made of a special alloy, and is cooled down until it sets by means of water which is circulated through the interior of the plates. This method of cooling is said to shorten the production process considerably in comparison with the former method of cooling the soap by means of flat baths and a current of air.

AT AN EXTRAORDINARY MEETING of Amalgamated Oxides, Ltd., last week, resolutions were passed by large majorities voluntarily winding up the company and approving an offer of purchase by Mr. L. O. Kekwick, works manager of the company. Mr. Kekwick has formed a new company, Amalgamated Oxides (1939), Ltd., together with Morris Ashby, Ltd., to carry on the business as far as zinc oxide manufacture is concerned, that is to say the business of the works at Dartford, at which zinc oxide of all grades is made. Morris Ashby, Ltd., were sole distributors for the old company. Mr. T. H. C. Gundry is to be the chairman and Mr. L. O. Kekwick, managing director, of the new company.

Inventions in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

PRODUCTION OF ANILINE DERIVATIVES.—Manchester Oxide Co., Ltd., J. H. Clayton and B. Bann. 4091.

PRODUCTION OF ORGANIC COMPOUNDS.—Manchester Oxide Co., Ltd., J. H. Clayton and B. Bann. 4092, 4093.

MANUFACTURE OF EPITHIO-ALKANES.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Netherlands, Feb. 16, '38.) 3680.

RECOVERY OF ORGANIC OXY-COMPOUNDS from their aqueous solutions containing one or more salts.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (United States, Feb. 19, '38.) 3733.

MAGNESIUM HYDROXIDE COMPOSITION OF MATTER, ETC.—C. H. Phillips Chemical Co. (United States, March 17, '38.) 3909.

PRODUCTION OF SYNTHETIC RESINS, ETC.—F. Pollak. (March 8, '38.) (Austria, Feb. 4, '38.) 3890.

TREATMENT OF LIQUID DISTILLABLE CARBONACEOUS MATERIALS.—H. E. Potts (Naamlooze Vennootschap Internationale Hydrogeneeringsoctrooien Maatschappij International Hydrogenation Patents Co.). 3737.

TREATMENT OF CARBONACEOUS MATERIALS.—H. E. Potts (Naamlooze Vennootschap Internationale Hydrogeneeringsoctrooien Maatschappij). 3936.

MANUFACTURE OF RUBBER DERIVATIVES.—C. A. Redfarn. 4075.

PRODUCTION OF EMULSIONS, ETC.—A. Renfrew, W. E. F. Gates, and Imperial Chemical Industries, Ltd. 3676.

ELECTROLYTIC PRODUCTION OF NEUTRAL HYPOCHLORINATED SOLUTIONS.—P. M. R. Salles. (France, Feb. 7, '38.) 3687.

MANUFACTURE OF MELAMINE.—Soc. of Chemical Industry in Basle. (Switzerland, Feb. 3, '38.) 3635; (Switzerland, Oct. 25, '38.) 3636; (Switzerland, Jan. 12.) 3637.

MANUFACTURE OF UREA DERIVATIVES.—Soc. of Chemical Industry in Basle. (Switzerland, Feb. 11, '38.) 4144; (Switzerland, Dec. 19, '38.) 4145.

COMPLETE REMOVAL OF ORGANIC SULPHUR COMPOUNDS from gases containing carbon monoxide and hydrogen.—Steinkohlen-Bergwerk Rheinpreussen. (Germany, July 2, '38.) 3618.

PREPARATION OF SOLVENT OIL and water resistant rubber hydrohalide compositions.—W. J. Tennant. 4042.

MANUFACTURE OF HYDROGEN PEROXIDE.—O. H. Walters, and Imperial Chemical Industries, Ltd. 3887.

PRODUCTION OF SULPHUR from gases containing sulphur dioxide. A. G. Exploration Co., Ltd., and C. T. Hill. 6441.

MANUFACTURE OF ELECTRIC RESISTANCE MATERIAL.—Aktiebolaget Kanthal. (Sweden, Feb. 25, '38.) 6468.

MANUFACTURE OF PROPENYL BENZENE DERIVATIVES.—A. Allen and Sons, Ltd., and T. F. West. 6367.

RUBBER ANTIOXIDANTS.—W. Baird, M. Jones, and Imperial Chemical Industries, Ltd. 6456.

CONCENTRATION OF DISPERSIONS OF RUBBER, ETC.—C. Bondy. 6224.

PROTECTION OF STEEL from pig iron.—H. A. Brassert and Co. (Germany, May 12, '38.) 6111.

METHODS OF TREATING RESINOUS MATERIALS.—British Thomson-Houston Co., Ltd. (United States, March 1, '38.) 6567.

MANUFACTURE OF FATTY AROMATIC CHLOROMETHYL COMPOUNDS.—A. Carpmael (I. G. Farbenindustrie.) 6284.

MANUFACTURE OF ORTHO-DIHYDROXY-AZO DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) 6609.

MANUFACTURE OF AZO DYESTUFFS.—A. Carpmael (I. G. Farbenindustrie.) 6610.

MANUFACTURE OF COMPOUNDS of the diaryl series.—A. Carpmael (I. G. Farbenindustrie.) 6746.

MANUFACTURE OF YELLOW MONOAZO DYESTUFFS.—Chemical Works, formerly Sandoz. (Switzerland, March 2, '38.) 6732.

MANGANESE ALLOYS.—Consolidated Mining and Smelting Co. of Canada, Ltd. (United States, April 1, '38.) 6623; (United States, April 2, '38.) 6624.

TREATMENT OF RUBBER.—Consolidated Rubber Manufacturers, Ltd. (United States, March 1, '38.) 6678.

MANUFACTURE OF ORGANIC PRODUCTS.—J. W. C. Crawford, T. K. Wood, R. Hill, and Imperial Chemical Industries, Ltd. 6457.

TREATMENT OF CELLULOSIC MATERIALS.—F. B. Dehn (Adler). 6107.

HEAT TREATMENT OF METALS.—E. I. du Pont de Nemours and Co. (United States, Feb. 24, '38.) 6237.

PURIFICATION OF WATER for consumption, etc.—Eau et Assainissement Anciens Etablissements, C. Gibault, and P. E. Chidaine. (Aug. 23, '37.) 6580.

TREATING MOLTEN FERROUS METALS, ETC.—Electro Metallurgical Co. (United States, April 14, '38.) 6368.

PROCESS FOR OBTAINING DEGRADATION PRODUCTS of scleroproteins.—J. G. Fife (Wülfing and Rosstothen). 6196.

PROCESS, ETC., FOR THE DEGASEFICATION, ETC., OF OILS.—W. J. Fraser and Co., Ltd., and J. W. Phipps. 6366.

PREPARATION OF CATALYSTS.—Gas Light and Coke Co., R. H. Griffith, and J. H. G. Plant. 6296.

MANUFACTURE OF DISAZO DYESTUFFS.—J. R. Geigy, A.-G. (Switzerland, Feb. 26, '38.) 6187.

MANUFACTURE OF POLYMERISATION PRODUCTS.—H. Gudgeon, R. Hill, and Imperial Chemical Industries, Ltd. 6628, 6629, 6630.

PRODUCTION OF A PARAFFIN MIXTURE readily oxidisable into the form of fatty acids.—Henkel and Cie. Ges. (Germany, April 28, '38.) 6762.

AMINO COMPOUNDS.—R. Hill, and Imperial Chemical Industries, Ltd. 6631.

MANUFACTURE OF SYNTHETIC RUBBER-LIKE MATERIALS.—I. G. Farbenindustrie. (Germany, Feb. 25, '38.) 6447.

SYNTHETIC LATEX-LIKE EMULSIONS.—I. G. Farbenindustrie. (Germany, Feb. 26, '38.) 6448.

DYESTUFF PASTES of the dibenzanthrone series, etc.—Imperial Chemical Industries, Ltd. (E. I. du Pont de Nemours and Co.). 6744.

MANUFACTURE OF COMPOUNDS of the dibenzanthrone series, etc. Imperial Chemical Industries, Ltd. (E. I. du Pont de Nemours and Co.). 6745.

REMOVAL OF IMPURITIES FROM GASES.—International Corporation, Ltd., and A. Ryner. 6024.

MANUFACTURE, ETC., OF LIQUID, ETC., HYDROCARBONS.—G. W. Johnson (I. G. Farbenindustrie.) (July 15, '38.) 6594, 6595.

MANUFACTURE OF DOUBLE COMPOUNDS OF FLUORINE and aluminium.—H. Kretzschmar. 6057.

DETERGENTS.—B. Laporte, Ltd., and I. E. Weber. 6282.

DECOMPOSITION OF CRYSTALLISED FERROUS SULPHATE.—P. de Lattre. (Belgium, Feb. 25, '38.) 6075.

PURIFICATION OF COAL GAS, ETC.—E. B. Maxted. 5966.

PRODUCTION OF HYDROCARBON FRACTIONS.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. (Netherlands, March 8, '38.) 6602.

MANUFACTURE OF ARTIFICIAL THREADS, ETC., from protein solutions.—Noomlaaze Vennootschap Onderzoekingsinstitut Research. (Germany, March 29, '38.) 6462.

MANUFACTURE OF SUSPENSIONS.—Philadelphia Quartz Co., J. G. Vail, and C. L. Baker. 6236.

PROCESSES FOR PROTECTING ARTICLES OF MAGNESIUM, ETC., from corrosion.—L. Renault. (France, April 5, '38.) 6102; (France, June 10, '38.) 6103; (France, Sept. 23, '38.) 6104.

EXTRACT OF WAX from peat.—J. Reilly, D. F. Kelly, and J. Duffy. (Eire, Nov. 25, '38.) 6320.

Complete Specifications Open to Public Inspection

PRODUCING HYDROCARBONS of high anti-knock value and boiling within motor-fuel boiling-range.—Universal Oil Products Co. Aug. 23, 1937. 34274/37

MOISTENING OF PRODUCTS, particularly organic products.—Guardite Corporation. Aug. 26, 1937. 2765/38.

PRODUCING AND REFINING SYNTHETIC FATTY ACIDS.—W. A. Farenholtz, G. Hubbe, and H. Hubbe (trading as Vereinigte Oelfabrigen Hubbe and Farenholtz). Aug. 25, 1937. 17341/38.

TREATMENT OF ZEIN.—Corn Products Refining Co. Aug. 23, 1937. 20195/38.

REFRACTORY MATERIAL for use in basic-process metallurgical furnaces.—G. B. Crespi. Aug. 27, 1937. 23649/38.

PRODUCTION OF INSECTICIDES.—Corn Products Refining Co. Aug. 21, 1937. 23828/38.

MANUFACTURE OF INSECT-REPELLENT MATERIALS and methods of applying the same.—E. I. du Pont de Nemours and Co. Aug. 26, 1937. 24029/38.

COLOURATION OF ARTIFICIAL MATERIALS.—British Celanese, Ltd. Aug. 25, 1937. 24092/38.

PROCESS FOR MANUFACTURING CYCLIC HYDROCARBONS from aliphatic hydrocarbons.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Aug. 27, 1937. 24494/38.

POLYMERISATION OF ACRYLIC and methacrylic compounds.—E. I. du Pont de Nemours and Co. Aug. 21, 1937. 24514/38.

SILICATE-CLAY ADHESIVES.—E. I. du Pont de Nemours and Co. Aug. 26, 1937. 24515/38.

PICKLING IRON and its alloys.—P. De Lattre. Aug. 21, 1937. 24581/38.

MANUFACTURE AND PRODUCTION OF ISOPROPYL ETHER.—I. G. Farbenindustrie. Aug. 24, 1937. 24832/38.

POLYMERISATION OF MONOMERIC PRODUCTS.—I. G. Farbenindustrie. Aug. 25, 1937. 25036/38.

POLYMERISING OLEFINES.—Gutehoffnungshutte Oberhausen, A.-G. Aug. 26, 1937. 25095/38.

MANUFACTURE OF AZO-DYESTUFFS.—Soc. of Chemical Industry in Basle. Aug. 27, 1937. 25107/38.

MANUFACTURE AND PRODUCTION OF SYNTHETIC TANNING-MATERIALS. I. G. Farbenindustrie. Aug. 26, 1937. 25151/38.

PROCESS FOR THE MANUFACTURE OF POLYAZODYESTUFFS.—I. G. Farbenindustrie. Aug. 27, 1937. 25240/38.

Specifications Accepted with Date of Application

MANUFACTURE OF CAPILLARY-ACTIVE COMPOUNDS.—W. W. Groves (I. G. Farbenindustrie.) April 27, 1937. (Samples furnished.) 500,032, 500,033, 500,034.

SUBSTITUTE FOR RUBBER.—D. Falls, and G. J. H. Tabor. May 20, 1937. 501,267.

TREATMENT AND PRODUCTION OF BERYLLIUM COMPOUNDS.—A. H. Stevens (Antioch College). May 19, 1937. 501,268.

STEEL ALLOYS.—Kohle-und Eisenforschung Ges. June 11, 1936. 501,336.

PRODUCTION AND UTILISATION OF ANTI-OXIDANTS.—E. W. Fawcett, and Imperial Chemical Industries, Ltd. June 18, 1937. 501,194.

PROCESS FOR THE MANUFACTURE OF ACIDS of the cyclopentanopolyhydrophenanthrene series and their derivatives.—Schering-Kahlbaum, A.-G. June 22, 1936. 501,196.

MANUFACTURE OF AZO DYESTUFFS.—W. H. Cliffe, and Imperial Chemical Industries, Ltd. July 14, 1937. (Samples furnished.) 501,131.

PRODUCTION OF DEPOLARISING COMPOSITIONS from hydrated pyrolusite.—I. G. Farbenindustrie. Nov. 6, 1936. 501,133.

PROCESS FOR MANUFACTURING CATALYSTS and for bringing about catalytic reactions therewith.—H. E. Girling (Legal representative of H. D. Elkington (deceased) (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). Aug. 21, 1937. 501,278.

MANUFACTURE OF PIPERIDINE COMPOUNDS.—W. W. Groves (I. G. Farbenindustrie.) Aug. 21, 1937. 501,135.

DISTILLATION AND HYDROGENATION OF LIQUID HYDROCARBONS and glycerides.—T. O. Wilton. Aug. 23, 1937. 501,280.

MANUFACTURE OF COMPOUNDS of the cyclopentanopolyhydrophenanthrene series.—W. W. Groves (I. G. Farbenindustrie.) Aug. 23, 1937. 501,421.

MANUFACTURE AND PRODUCTION OF ADHESIVE PASTES.—G. W. Johnson (I. G. Farbenindustrie.) Aug. 23, 1937. (Samples furnished.) 501,283.

RECOVERY OF OXYGEN from gaseous mixtures.—K. C. Warne, J. W. Woolcock, and Imperial Chemical Industrits, Ltd. Aug. 23, 1937. 501,287.

TREATING CELLULOSIC TEXTILE MATERIALS.—J. G. Evans, and Imperial Chemical Industries, Ltd. Aug. 23, 1937. 501,288.

ELECTROCHEMICAL PRODUCTION OF MANGANESE.—Metallic Manganese Co., Ltd. Sept. 10, 1936. 501,406.

MANUFACTURE OF AMINOANTHRAQUINONES.—G. Lord, and G. Reeves. Aug. 24, 1937. 501,341.

ALLOYS.—British Insulated Cables, Ltd., W. J. Clements, and H. W. Barron. Aug. 24, 1937. 501,291.

MANUFACTURE OF RESINOUS CONDENSATION PRODUCTS.—A. Carpmael (I. G. Farbenindustrie.) Aug. 24, 1937. 501,407.

PRODUCTION OF REDUCING SUGAR COMPOSITIONS, and the products resulting therefrom.—A. H. Stevens (A. E. Staley Manufacturing Co.). Aug. 25, 1937. 501,142.

SEPARATION OF AMMONIA and hydrogen sulphide from gases.—G. W. Johnson (I. G. Farbenindustrie.) Aug. 25, 1937. 501,208.

TREATMENT OF ACID SLUDGE from mineral oil and benzol refining. Manvers Main Collieries, Ltd., W. F. Carr, T. G. Woolhouse, and W. Green. Oct. 4, 1937. 501,077.

MELTING AND PURIFYING SULPHUR.—Imperial Chemical Industries, Ltd. (Canadian Industries, Ltd.). Aug. 27, 1937. 501,366.

MANUFACTURE OF LUBRICATING-OILS.—A. H. Stevens (Standard Oil Co. (Ohio)). Aug. 31, 1937. 501,369.

MANUFACTURE OF BUTADIENE.—G. W. Johnson (I. G. Farbenindustrie.) Sept. 1, 1937. 501,071.

DISPERSION OF OLEFINES IN ACID POLYMERISATION.—Standard Oil Development Co. Oct. 24, 1936. 501,145.

PURIFICATION OF RUBBER.—Western Electric Co., Ltd. (Bell Telephone Laboratories, Inc.). Sept. 28, 1937. 501,216.

TREATING TARS, fuel oils, and bitumens.—H. J. Hodsman. Oct. 9, 1937. 501,301.

DESTRUCTIVE DISTILLATION OF COAL.—National Fuels Corporation. Oct. 24, 1936. 501,374.

APPARATUS FOR THE RECOVERY OF NITROGEN and oxygen.—G. W. Johnson (I. G. Farbenindustrie.) Oct. 22, 1937. 501,305.

SEPARATING SULPHURIC ACID from mixtures of sulphuric acid and sulphuric acid esters.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Dec. 24, 1936. 501,087.

PROCESSES FOR MANUFACTURING LOCAL ANAESTHETIC BASES.—A. H. Stevens (Novocol Chemical Mfg. Co., Inc.). June 16, 1937. 501,090.

POLYMERISATION OF VINYLIDENE CHLORIDE.—W. J. Tennant (Dow Chemical Co.). Jan. 1, 1938. 501,169.

MANUFACTURE OF MIXED LEAD and lead oxide.—National Lead Co. Feb. 10, 1937. 501,175.

PRODUCTION OF THE FORMALDEHYDE-SULPHOXYLATE DERIVATIVE of dihydroxydiaminoarsenobenzene base.—Zaklady Chemiczne Hydrox Spolka Z Ograniczona Odpowiedzialnoscia, and A. Ende. Feb. 17, 1938. 501,229.

THERAPEUTICALLY ACTIVE ORGANIC ANTIMONY COMPOUNDS and the process for their manufacture.—Soc. des Usines Chimiques Rhone-Poulenc. April 1, 1937. 501,232.

PREPARATION OF OPTICALLY-ACTIVE β-(*p*-OXYPHENOL)-ISOPROPYL-METHYLAMINES.—Knoll, A.-G., Chemische Fabriken. April 17, 1937. 501,099.

PROCESS FOR THE MANUFACTURE OF ALUMINIUM or aluminium alloys.—D. Gardner. March 31, 1938. 501,233.

PRODUCTION OF HYDROGEN PEROXIDE.—Mathieson Alkali Works. July 22, 1937. 501,385.

PREPARATION OF COMPOSITIONS containing urea-formaldehyde condensation products.—S. L. M. Saunders, and L. W. Coveney. April 26, 1938. 501,388.

MANUFACTURE OF RUBBER HYDROHALIDE FILM.—G. C. Mack. May 3, 1938. 501,239.

PRODUCTION OF KNOCK-STABLE, low-boiling motor-fuels by the hydrogenation of liquid hydrocarbons.—H. E. Potts (Naamlooze Vennootschap Internationale Maatschappij voorheen Hydreerings-Techniek en Chemie (International Hydrogenation Engineering and Chemical Co.)). May 7, 1938. 501,318.

PROCESS FOR THE MANUFACTURE OF STABLE IODINE-STARCH COMPOUNDS.—W. P. Williams (R. Schering). June 9, 1938. 501,246.

HYDROGENATION OF LIQUID OLEFINE POLYMERS.—Naamlooze Vennootschap Internationale Hydrogeneerings-Octrooien Maatschappij (International Hydrogenation Patents Co.). June 11, 1937. 501,325.

Chemical and Allied Stocks and Shares

THE upward trend on the Stock Exchange has been assisted this week by hopeful reports from trade centres and by the lower unemployment figures. A broadening of activity appeared to be in evidence in shares of companies associated with the chemical and allied industries.

* * * *

The ordinary units of the Distillers Company have risen further from 92s. 9d. to 94s. 3d. at the time of writing, and there was better demand reported for Murex shares, which are 83s. 9d. compared with 79s. 4½d. a week ago. Although " ex " the final dividend, Associated Cement are unchanged on balance at 75s. Other shares of cement manufacturers were also more active, partly owing to the belief that before long a quota agreement may be announced to prevent the development of excessive competition in the industry. British Plaster Board were favoured in view of the generous yield on the basis of last year's 50 per cent. dividend, and as compared with a week ago, the price has risen from 26s. 3d. to 28s. 6d.

* * * *

Imperial Chemical were firm at the slightly higher price of 32s. 4½d., the disposition being to await the impending dividend announcement. British Oxygen showed a further gain from 75s. to 76s. 10½d. and Turner and Newall also moved in favour of holders. Lever and Unilever, which were in demand on the assumption that the 10 per cent. dividend is likely to be maintained, are 38s. 3d., compared with 35s. 3d. a week ago.

* * * *

Pinchin Johnson were slightly lower at 26s. 6d., but Indestructible Paint were firm on the dividend and International Paint shares transferred around 75s. Cotton textile securities were inclined to show more activity, but rayon shares had a rather less active appearance, the disposition being to await Courtaulds' meeting on Wednesday next.

* * * *

There was increased attention given to shares of iron and steel securities in view of the various dividends and results which have come to hand recently. Colvilles and Baldwins were little changed on balance, although the maintenance of the dividend payments was up to market expectations. Dorman Long made a higher price, but Guest Keen were inclined to react following an earlier gain. Staveley ordinary shares remained under the influence of the lower payment and changed hands around 40s. United Steel ordinary units were better at 24s. 6d.

* * * *

Strong demand developed for Boots Drug ordinary on a revival of market talk of the possibility of a scrip bonus distribution, and although best prices touched this week were not held, the shares show a rise from 40s. 7½d. to 45s. 6d. on balance. As the company has large reserves and a very strong balance sheet a scrip bonus could be distributed at any time, but there has not, of course, been any official indication that a development of this kind can be anticipated. Timothy Whites and Taylors were slightly higher at 25s. 4½d. and Sangers improved from 21s. to 21s. 6d. British Drug Houses were 21s. 3d.

* * * *

In other directions Fison Packard and Prentice were maintained at 38s. 9d., while British Oil and Cake Mills preferred ordinary changed hands at 41s. awaiting the past year's results. United Premier Oil and Cake ordinary shares were quoted at 7s. 9d. United Molasses units were in strong demand, and as compared with a week ago have risen from 24s. 1½d. to 27s. 1½d. Anglo-Iranian, " Shell " and other leading oil shares were again higher.

Weekly Prices of British Chemical Products

THE price position remains steady in pretty well every section of the industrial chemical market, and it is thought that little change is likely to take place over the next few months. Trade during the past week has been about normal for the period and ex-contract deliveries have been proceeding on a satisfactory scale. The better export inquiry reported in recent weeks has been maintained and the outlook in this direction is promising. The tone of the market is firm with quotations unchanged at recent levels. Cheerful conditions prevail in the market for coal tar products and quite a good volume of export inquiry has been in evidence during the past week. Xylol and toluol continue firm for a good demand and considerably more interest is being displayed in cresylic acid and carbolic acid. The price position is firm and the prospects are brighter than for a long time past.

Price Changes

Rises: Copper Sulphate (Manchester).

Falls: Glycerine.

MANCHESTER.—The better tendency on the Manchester market for chemical products has continued during the past week. This, however, is reflected more in the movement of supplies against contracts than in the volume of new business passing, the latter still being only moderate and confined chiefly to near delivery positions. So far as values are concerned, these are generally steady. Among the by-products a fair inquiry is reported for the light distillates at a steady range of prices, but business in pitch and creosote oil, as well as carbolic acid, remains rather subdued.

GLASGOW.—Business in general chemicals has continued on a steady basis during the week for home trade, though export business still remains very limited. Prices generally continue firm at about last week's figures, with no important changes to report.

General Chemicals

ACETONE.—£39 to £43 per ton, according to quantity.

ACETIC ACID.—Tech., 80%, £30 5s. per ton; pure 80%. £32 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 5s. 0d. per ton d/d Lancs. GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 1s. to 1s. 1d. per lb. d/d in cylinders. SCOTLAND: 10½d. to 1s. 0½d., containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks

AMMONIUM CHLORIDE.—Grey, £17 10s. per ton, d/d U.K. Fine white, 98%, £16 per ton, d/d U.K.

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM DICHROMATE.—8½d. per lb. d/d U.K.

ANTIMONY OXIDE.—£68 per ton.

ARSENIC.—Continental material £11 per ton c.i.f., U.K. ports; Cornish White, £12 5s. to £12 10s. per ton f.o.r., mines, according to quantity. MANCHESTER: White powdered Cornish, £16 per ton, ex store.

BARIUM CHLORIDE.—£11 10s. to £12 10s. per ton in casks ex store. GLASGOW: £12 per ton.

BLEACHING POWDER.—Spot, 35/37%, £9 5s. per ton in casks, special terms for contract. SCOTLAND: £9 5s. per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

BORIC ACID.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

CALCIUM BISULPHITE.—£6 10s. per ton f.o.r. London.

CHARCOAL, LUMP.—£6 to £6 10s. per ton, ex wharf. Granulated, £7 to £9 per ton according to grade and locality.

CHLORINE, LIQUID.—£18 15s. per ton, seller's tank wagons, carriage paid to buyer's sidings; £19 5s. per ton, d/d in 16/17 cwt. drums (3-drum lots); £19 10s. per ton d/d in 10-cwt. drums (4-drum lots); 4⅝d. per lb. d/d station in single 70-lb. cylinders.

CHROMETAN.—Crystals, 2⅝d. per lb.; liquor, £13 per ton d/d station in drums. GLASGOW: 70/75% solid, £5 15s. per ton net ex store.

CHROMIC ACID.—9d. per lb., less 2½%; d/d U.K.

CHROMIC OXIDE.—11½d. per lb.; d/d U.K.

CITRIC ACID.—1s. 0¼d. per lb. MANCHESTER: 1s. 0¼d. SCOTLAND: B.P. crystals, 1s. 0¼d. per lb.; less 5%, ex store.

COPPER SULPHATE.—£18 5s. per ton, less 2% in casks. MANCHESTER: £18 17s. 6d. per ton f.o.b. SCOTLAND: £19 10s. per ton, less 5%, Liverpool in casks.

CREAM OF TARTAR.—100%, 92s. per cwt., less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£20-£22 per ton.

FORMIC ACID.—85%, in carboys, ton lots, £42 to £47 per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g., in tins, £3 10s. to £4 10s. per cwt. according to quantity; in drums, £3 2s. 6d. to £3 16s. 0d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

HYDROCHLORIC ACID.—Spot, 5s. 6d. to 8s. carboy d/d according to purity, strength and locality.

IODINE.—Resublimed B.P., 6s. 9d. per lb. in 7 lb. lots.

LACTIC ACID.—(Not less than ton lots). Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50%, by vol., £41. One-ton lots ex works, barrels free.

LEAD ACETATE.—LONDON: White, £31 10s. ton lots; brown, £35. GLASGOW: White crystals, £29 10s.; brown, £1 per ton less. MANCHESTER: White, £31; brown, £30.

LEAD, NITRATE.—£32 per ton for 1-ton lots.

LEAD, RED.—£30 15s. 0d. 10 cwt. to 1 ton, less 2½% carriage paid. SCOTLAND: £30 per ton, less 2¼% carriage paid for 2-ton lots.

LITHARGE.—SCOTLAND: Ground, £30 per ton, less 2½ %, carriage paid for 2-ton lots.

MAGNESITE.—Calcined, in bags, ex works, about £8 per ton. SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—Solid (ex wharf) £5 10s. per ton. SCOTLAND: £7 5s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 10s. per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 6s. 5d. per lb.; powder B.P., 6s. 7d.; bichloride B.P. (corros. sub.), 5s. 8d.; powder B.P. 5s. 4d.; chloride B.P. (calomel), 6s. 5d.; red oxide cryst. (red precip.), 7s. 6d.; levig., 7s.; yellow oxide B.P. 6s. 10d.; persulphate white B.P.C., 6s. 7d.; sulphide black (hyd. sulph. cum. sulph. 50%), 6s. 6d. For quantities under 112 lb., 1d. extra; under 28 lb., 5d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

NITRIC ACID.—Spot, £25 to £30 per ton according to strength, quantity and destination.

OXALIC ACID.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

PARAFFIN WAX.—SCOTLAND: 3½d. per lb.

POTASH, CAUSTIC.—Solid, £33 5s. to £38 per ton according to quantity, ex store; broken, £40 per ton. MANCHESTER: £38.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4¼d. per lb. MANCHESTER: £37 per ton.

POTASSIUM DICHROMATE.—5¼d. per lb. carriage paid. SCOTLAND: 5¼d. per lb., net, carriage paid.

POTASSIUM IODIDE.—B.P. 6s. 3d. per lb. in 7 lb. lots.

POTASSIUM NITRATE.—Small granular crystals, £24 to £27 per ton ex store, according to quantity. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9¼d. to 10¼d. per lb. SCOTLAND: B.P. Crystals, 10¼d. MANCHESTER: B.P. 9¼d. to 11¼d.

POTASSIUM PRUSSIATE.—5¼d. to 6d. per lb. SCOTLAND: 6¾d. net, in casks, ex store. MANCHESTER: Yellow, 6d. to 6¼d.

PRUSSIATE OF POTASH CRYSTALS.—In casks, 6¼d. per lb. net, ex store

SALAMMONIAC.—Firsts lump, spot, £42 17s. 6d. per ton, d/d address in barrels. Dog-tooth crystals, £35 per ton; fine white crystals, £18 per ton, in casks, ex store. GLASGOW: Large crystals, in casks, £37 10s.

SALT CAKE.—Unground, spot, £3 8s. 6d. per ton.

SODA ASH.—Light 98/100%, £5 17s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, 13s. 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £18 10s. in drums, £19 5s. in casks, Solid 76/77° £15 12s. 6d. in drums; 70/73%, £15 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts, 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£19-£20 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags in 1-ton lots. GLASGOW: £13 5s. per ton in 1 cwt. kegs, £11 5s. per ton in 2-cwt. bags. MANCHESTER: £10 15s.

SODIUM BISULPHITE POWDER.—60/62%, £12 10s. to £14 per ton d/d in 2-ton lots for home trade.

SODIUM CARBONATE MONOHYDRATE.—£20 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£27 10s. to £32 per ton. GLASGOW: £1 11s. per cwt., minimum 3 cwt. lots.

SODIUM DICHROMATE.—Crystals cake and powder 4½d. per lb. net d/d U.K. with rebates for contracts.

SODIUM CHROMATE.—4½d. per lb. d/d U.K.

4d. per lb. GLASGOW: 4½d. net, carriage paid.

SODIUM HYPOSULPHITE.—Pea crystals, £15 5s. per ton for 2-ton lots; commercial, £11 5s. per ton. MANCHESTER: Commercial, £11; photographic, £15 10s.

SODIUM METASILICATE.—£14 5s. per ton, d/d U.K. in cwt. bags.

SODIUM NITRATE.—Refined, £8 per ton for 6-ton lots d/d. GLASGOW: £1 12s. 0d. per cwt. in 1-cwt kegs, net, ex store.

SODIUM NITRITE.—£18 5s. per ton for ton lots.

SODIUM PERBORATE.—10%, £4 per cwt. d/d in 1-cwt. drums.

SODIUM PHOSPHATE.—Di-sodium, £12 per ton delivered for ton lots. Tri-sodium, £16 10s. per ton delivered per ton lots.

SODIUM PRUSSIATE.—4d. per lb. for ton lots. GLASGOW: 4d. MANCHESTER: 4½d. to 5d.

SODIUM SILICATE.—£8 2s. 6d. per ton.

SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 to £3 10s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 10s.

SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 15s. per ton d/d in drums; crystals, 30/32%, £9 per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 10s.

SODIUM SULPHITE.—Pea crystals, spot, £14 10s. per ton d/d station in kegs.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

SULPHURIC ACID.—168° Tw., £4 11s. to £5 1s. per ton; 140° Tw., arsenic-free, £3 to £3 10s.; 140° Tw., arsenious, £2 10s.

TARTARIC ACID.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1½d. per lb., 5%, ex store.

ZINC SULPHATE.—Tech., £11 10s. f.o.r., in 2 cwt. bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 7d. to 1s. 2d. per lb., according to quality. Crimson, 1s. 6d. to 1s. 7½d. per lb.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARYTES.—£6 to £6 10s. per ton, according to quality.

CADMIUM SULPHIDE.—3s. 0d. to 3s. 3d. per lb.

CARBON BLACK.—3⅝d. to 4 1/16d. per lb., ex store.

CARBON DISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.

CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.

CHROMIUM OXIDE.—Green, 10½d. to 11½d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5d. per lb.; dark 3⅝d. to 4⅜d. per lb.

LAMP BLACK.—£24 to £26 per ton del., according to quantity. Vegetable black, £35 per ton upwards.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE.—Spot, 30%, £16 10s. per ton, 2-ton lots d/d in bags.

SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.

VERMILION.—Pale, or deep, 5s. per lb., 1-cwt. lots.

ZINC SULPHIDE.—£58 to £60 per ton in casks ex store, smaller quantities up to 1s. per lb.

Nitrogen Fertilisers

AMMONIUM SULPHATE.—The following prices have been announced for neutral quality basis 20.6% nitrogen, in 6-ton lots delivered farmer's nearest station up to June 30, 1939; November, £7 8s.; December, £7 9s. 6d.; January, 1939; £7 11s.; February, £7 12s. 6d.; March/June, £7 14s.

CALCIUM CYANAMIDE.—The following prices are for delivery in 5-ton lots, carriage paid to any railway station in Great Britain up to June 30, 1939; November, £7 12s. 6d.; December, £7 13s. 9d.; January, 1939, £7 15s.; February, £7 16s. 3d.; March, £7 17s. 6d.; April/June, £7 18s. 9d.

NITRO CHALK.—£7 10s. 6d. per ton up to June 30, 1939.

SODIUM NITRATE.—£8 per ton for delivery up to June 30, 1939.

CONCENTRATED COMPLETE FERTILISERS.—£11 4s. to £11 13s. per ton in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE FERTILISERS.—£10 19s. 6d. to £14 16s. 6d. per ton in 6-ton lots to farmer's nearest station.

Coal Tar Products

BENZOL.—At works, crude, 9½d. to 10d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d., pure 1s. 8½d. to 1s. 9d. GLASGOW: Crude, 10d. to 10½d. per gal.; motor, 1s. 4d. to 1s. 4½d. MANCHESTER: Pure, 1s. 8d. to 1s. 8½d. per gal.; crude, 11½d. per gal.

CARBOLIC ACID.—Crystals, 6⅞d. to 7⅛d. per lb., small quantities would be dearer; Crude, 60's, 1s. 7½d. to 1s. 10d.; dehydrated, 2s. 6d. per gal., according to specification; Pale, 99/100%, per lb. f.o.b. in drums; crude, 2s. 1d. per gal.

CREOSOTE.—Home trade, 3½d. to 4d. per gal., f.o.r., makers' works; exports 6d. to 6¼d. per gal., according to grade. MANCHESTER: 3d. to 4d. GLASGOW: B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils, 5¾d. to 6¼d.

CRESYLIC ACID.—97/99%, 1s. 5d. to 1s. 8d.; 99/100%, 1s. 9d. to 2s. 6d. per gal., according to specifications; Pale, 99/100%, 1s. 7d. to 1s. 9d.; Dark, 95%, 1s. 3d. to 1s. 4d. per gal. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale, 97/99%, 4s. 6d. to 4s. 10d., dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. to 2s. 6d. American specification, 3s. 9d. to 4s. MANCHESTER: Pale, 99/100%, 1s. 9d. to 1s. 10d.

NAPHTHA.—Solvent, 90/160, 1s. 6d. to 1s. 7d. per gal.; solvent, 95/160%, 1s. 7d. to 1s. 8d., naked at works; heavy 90/190%, 1s. 1½d. to 1s. 3d. per gal., naked at works, according to quantity. MANCHESTER: 90/160%, 1s. 5d. to 1s. 7d. per gal. GLASGOW: Crude, 6½d. to 7½d. per gal.; 90%, 160, 1s. 5d. to 1s. 6d., 90%, 190, 1s. 1d. to 1s. 3d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £4 10s. to £5 10s. per ton; purified crystals, £9 10s. per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £4 10s. per ton. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £11 10s. to £12 10s. per ton f.o.b.

PITCH.—Medium, soft, 30s. per ton, f.o.b. MANCHESTER: 27s. 6d. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.

PYRIDINE.—90/140%, 12s. to 13s. 6d. per gal.; 90/160%, 10s. to 11s. per gal.; 90/180%, 3s. to 4s. per gal. f.o.b. GLASGOW: 90% 140, 10s. to 12s. per gal.; 90% 160, 9s. to 10s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 11s. to 13s. 6d. per gallon.

TOLUOL.—90%, 1s. 11d. to 2s. per gal; pure 2s. 3d. to 2s. 4d. GLASGOW: 90% 120, 1s. 10d. to 2s. 1d. per gal. MANCHESTER: Pure, 2s. 3d. per gallon, naked.

XYLOL.—Commercial, 1s. 11½d. to 2s. 0½d. per gal.; pure, 2s. 3½d. to 2s. 4d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

CALCIUM ACETATE.—Brown, £6 15s. to £9 5s. per ton; grey, £8 to £8 5s. MANCHESTER: Brown, £8 10s.; grey, £10.

METHYL ACETONE.—40.50%, £32 to £35 per ton.

WOOD CREOSOTE.—Unrefined, 6d. to 8d. per gal., according to boiling range.

WOOD NAPHTHA, MISCIBLE.—2s. 8d. to 3s. per gal.; solvent, 3s. to 3s. 5d. per gal.

WOOD TAR.—£3 to £8 per ton, according to quality.

Intermediates and Dyes

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZIDINE, HCl.—2s. 7½d. per lb., 100% as base, in casks.

BENZOIC ACID, 1914 B.P. (ex toluol).—1s. 11½d. per lb. d/d buyer's works.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots.

o-CRESOL 30/31° C.—6½d to 7½d. per lb. in 1-ton lots.

p-CRESOL, 34-5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

DICHLORANILINE.—2s. 1½d. to 2s. 5½d. per lb.

DIMETHYLANILINE.—Spot, 1s. 7½d. per lb., package extra.

DINITROBENZENE.—7½d. per lb.

DINITROCHLORBENZENE, SOLID.—£79 5s. per ton.

DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 11d.

DIPHENYLAMINE.—Spot, 2s. 2d. per lb., d/d buyer's works.

GAMMA ACID, Spot, 4s. 4½d. per lb. 100% d/d buyer's works.

H ACID.—Spot, 2s. 7d. per lb.; 100% d/d buyer's works.

NAPHTHIONIC ACID.—1s. 10d. per lb.

β-NAPHTHOL.—£97 per ton; flake, £94 8s. per ton.

α-NAPHTHYLAMINE.—Lumps, 1s. 1d. per lb.

β-NAPHTHYLAMINE.—Spot, 3s. per lb.; d/d buyer's works.

NEVILLE AND WINTHER'S ACID.—Spot, 3s. 3½d. per lb. 100%.

o-NITRANILINE.—4s. 3½d per lb.

m-NITRANILINE.—Spot, 2s. 10d. per lb. d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 10d. to 1s. 11d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra. 1-ton lots d/d buyer's works.

NITRONAPHTHALENE.—9½d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 11d. per lb.; 100% d/d buyer's works.

SULPHANILIC ACID.—Spot, 8⅔d. per lb. 100%, d/d buyer's works.

o-TOLUIDINE.—10½d. per lb., in 8/10 cwt. drums, drums extra.

p-TOLUIDINE.—1s. 10½d. per lb., in casks.

m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

JOHNSON AND SONS, MANUFACTURING CHEMISTS, LTD., London, N.W. (M., 11/3/39.) Feb. 22, £35,000 debenture, to Abechurch Nominees, Ltd.; general charge. *£40,000 debentures. Aug. 10, 1938.

Satisfactions

BRITISH XYLONITE CO., LTD., London, E. (M.S., 11/3/39.) Satisfaction Feb. 28, of debenture stock registered Aug. 15, 1933, to extent of £150,000 and premium, and unissued balance £100,000 has been cancelled.

Company Winding-up Voluntarily

CONSOLIDATED PHARMACEUTICALS, LTD. (C.W.U.V., 11/3/39.) Feb. 28 (members). W. C. Northcott, 6 Gt. Winchester Street, E.C., appointed liquidator.

New Companies Registered

The Study Co., Ltd. 350,087.—Private company. Capital £600 in £1 shares (200 " A," 200 " B " and 200 " C "). To adopt an agreement with the Gas Light and Coke Company, the Distillers Company, Ltd., and Powell Duffryn Associated Collieries, Ltd., to promote and carry on investigations into any process for the production of hydrocarbons from coal or coke, or any process ancillary thereto, to collect and collate statistics and technical information relating to any such processes, etc. Subscribers: William Ritchie, 18 Austin Friars, E.C.; Edward M. F. Jones; Vernon F. Royle.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the " Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Norway.—An agent established at Oslo wishes to obtain the representation of United Kingdom manufacturers of heavy chemicals. (Ref. No. 200.)

Egypt.—H.M. Consul-General at Alexandria reports that the Alexandria Municipality is calling for tenders for the supply and delivery of quantities of paints, oils, brushes, etc. Tenders should be addressed to the Director-General, Alexandria Municipality, Egypt, by whom they will be received up to April 19, 1939. (Ref. T. 19350/39.)

The Commercial Secretary to H.M. Embassy in Egypt reports that the Egyptian Ministry of Agriculture is calling for tenders (two separate contracts) for the supply and delivery of: (1) 150 kilos. of strychnine powder; (2) 281,000 kilos. of sodium cyanide; 419,000 kilos. of sulphuric acid; 6,000 kilos. of carbon bisulphide. Tenders should be addressed to Le Controle des Magasins, Achats et Ateliers, Dokki, Egypt, where they will be received up to 11 a.m. on April 8, 1939. (Ref. T. 19440/39.)

Argentina.—The Commercial Counsellor to H.M. Embassy at Buenos Aires reports that the Argentine State Railways Administration is calling for tenders, to be presented in Argentina by March 29, 1939, for the supply of quantities of paints in paste and powder form and prepared paints ready for use. (Ref. T.Y. 19322/39.)

Australia.—A well-established firm of chemical manufacturers and agents at Melbourne wishes to obtain the sole representation, on a basis to be arranged, of United Kingdom manufacturers of raw materials, machinery and special products used by paint and varnish manufacturers, rubber manufacturers, dyers, manufacturing chemists for Australia. (Ref. No. 188.)

British India.—A well-established firm of agents at Karachi wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of chemists' sundries for Sind, Baluchistan, Punjab, North-West Frontier Provinces, Kashmir, Delhi and the United Provinces. (Ref. No. 189.)

British West Indies.—A well-established merchant and commission agent at Belize wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of lubricating oils and greases, soap, for the British Honduras. (Ref. No. 191.)

Forthcoming Events

London.

March 14.—Institution of Chemical Engineers. Burlington House, Piccadilly, W.1. 6 p.m. R. L. Quertier, " Problems of Compressor and Compressed Gases in Industry."

British Association of Chemists. Conway Hall, Red Lion Square, W.C.1. 8 p.m. Professor J. B. S. Haldane, " Heredity, Chemistry and Politics."

March 14 and **21.**—Royal Institution. 21 Albemarle Street, W.1. 5.15 p.m. W. L. Bragg, " The Chemistry of the Solid State."

March 15.—Electrodepositors' Technical Society. Northampton Polytechnic Institute, St. John Street, E.C.1. 8 p.m. Discussion on " The Behaviour of Nickel Anodes."

March 16.—Sir John Cass Technical Institute. Jewry Street, Aldgate, E.C.3. 6.30 p.m. S. Judd Lewis, " Spectroscopic Analysis."

The Chemical Society. Burlington House, Piccadilly, W.1. 8 p.m. Meeting for the reading of original papers.

March 17.—Royal Institution. 21 Albemarle Street, W.1. 9 p.m. W. H. Hatfield, " New Researches in Steel Metallurgy."

Birmingham.

March 14.—Institute of the Plastics Industry. James Watt Memorial Institute, Great Charles Street. 8 p.m. A. R. Dunton, " Plastics in the Electrical Industry."

Bristol.

March 16.—Institute of Chemistry. The University, Woodland Road. 5.30 p.m. Annual Meeting. Professor H. V. A. Briscoe, " Micro-Chemistry."

Glasgow.

March 13.—Institute of Metals. Institution of Engineers and Shipbuilders in Scotland, 39 Elmbank Crescent. 7.30 p.m. Annual General Meeting. Selection from Institute papers.

Leeds.

March 20.—Chemical Engineering Group. Joint meeting with the Yorkshire Section of the Society of Chemical Industry. G. B. Jones and W. Welch, " The Design and Construction of Chemical Plant from the Operator's Viewpoint."

Liverpool.

March 16.—British Association of Chemists. Liverpool Section Dinner and Social Evening. St. George's Restaurant, Lime Street. 6.45 p.m.

Manchester.

March 13.—Institute of the Plastics Industry. Engineers' Club, Albert Square. 7.30 p.m. Prize papers.

March 20.—Society of Chemical Industry. Joint meeting with the Chemical Society and Institution of the Rubber Industry. Engineers' Club, Albert Square. 7.30 p.m. Dr. H. W. Melville, " The Mechanism of Polymerisation Reactions."

Newcastle.

March 14.—Institute of Metals. King's College. 7.30 p.m. G. E. Lewis, " Die-Casting "

March 16.—Institute of Fuel. Joint meeting with the Coke Oven Managers' Association. King's College. 7.30 p.m. Dr. G. E. Foxwell, " Dangerous Swelling Pressures in Carbonisation Practice."

March 20.—Coke Oven Managers' Association. Professor H. L. Riley, " Coke Research."

Stoke-on-Trent.

March 13.—British Ceramic Society (Pottery Section). North Staffordshire Technical College. 7.30 p.m. H. J. Plant, " Alumina and its Uses in the China Trade."

Swansea.

March 21.—Institute of Metals. Y.M.C.A. Swansea. 6.30 p.m J. L. Haughton, " Developments in Apparatus for Metallurgical Research."

Company News

The Celanese Corporation of America report net profits for 1938 of $2,479,748. Canadian, Celanese, Ltd.'s, profits for 1938 amounted to $1,194,847 ($1,266,702).

Savory and Moore, Ltd., manufacturing chemists, are paying fixed half-yearly dividends on 6 per cent. cumulative preference and 7½ per cent. cumulative preference (participating) shares due on March 31.

British Oil & Cake Mills, Ltd., have declared a final dividend of 5 per cent. on the ordinary stock, making 9 per cent. for 1938 against 10 per cent. Net profits for 1938 amounted to £530,488 (£566,737).

The Indestructible Paint Co., Ltd., have declared a final dividend on the ordinary shares of 17½ per cent., making 25 per cent., for the year ended December 31 (same). Net profits for the year amounted to £50,362 (£52,725).

Evans, Son, Lescher and Webb, Ltd., manufacturing chemists, report a trading profit for 1938 of £39,140 (£55,731). To tax and N.D.C., £9,739 (£12,947); net profit, £20,056 (£33,197). To general reserve, £5,000 (£15,000); one year's dividend on 6 per cent. preference shares, less tax (one and a-half year's preference dividend); forward, £11,048 (£11,047).